

**2008 CLEANING AND DEMOLITION PROJECT  
ASARCO EAST HELENA PLANT  
INTRODUCTION, PROJECT SUMMARY, AND REPORTING**

Prepared by:  
**ASARCO LLC**  
P.O. Box 1230  
East Helena, MT 59635

**AND  
2008 WORK PLAN**

Prepared by:  
**URS Corporation/Cleveland Wrecking Company**  
614 East Edna Place  
Corvina, CA 91723

**March 12, 2008  
Final May 29, 2008**

**2008 CLEANING AND DEMOLITION PROJECT WORK PLAN**  
**ASARCO EAST HELENA PLANT**  
**INTRODUCTION, PROJECT SUMMARY, AND REPORTING**

Prepared by:  
**ASARCO LLC**  
P.O. Box 1230  
East Helena, MT 59635

**March 12, 2008**  
**Final May 29, 2008**

## TABLE OF CONTENTS

LIST OF TABLES.....	ii
LIST OF APPENDICES.....	iii
1.0 INTRODUCTION.....	1
2.0 PROJECT SUMMARY .....	3
3.0 MANAGEMENT OF REMOVED MATERIALS .....	3
4.0 INTERIM MEASURE PROGRAM .....	3
4.1 Final Cleaning Action .....	4
4.2 Backfill Locations and Fumed Slag Composition .....	4
4.3 Location of Interim Caps .....	5
4.4 Interim Cap Techniques, Procedures and Materials .....	5
4.5 Maintenance of Interim Cap .....	6
4.5.1 Site Inspection.....	6
4.5.2 Site Security.....	6
4.5.3 Site Maintenance .....	6
4.6 Departmental Inspections and Confirmation .....	8
5.0 REPORTING.....	8
5.1 Quarterly Reporting.....	8
5.2 Annual Reporting .....	9
6.0 REFERENCES.....	9

## LIST OF TABLES

TABLE 4-1. PRIORITY OF MAINTENANCE TASKS.....	7
TABLE 4-2. EMERGENCY NOTIFICATION CONTACTS AND PHONE NUMBERS .....	8

## LIST OF APPENDICES

- APPENDIX A COMPREHENSIVE LIST OF PROCESS UNITS AND OTHER AREAS OF INTEREST  
(MARCH 2008)
- APPENDIX B FUMED SLAG ANALYTICAL DATA
- APPENDIX C EXAMPLE INSPECTION FORM



# **2008 CLEANING AND DEMOLITION PROJECT WORK PLAN**

## **ASARCO EAST HELENA PLANT**

### **INTRODUCTION, PROJECT SUMMARY, AND REPORTING**

#### **1.0 INTRODUCTION**

---

Asarco Incorporated, now known as ASARCO LLC (Asarco), and the Montana Department of Environmental Quality (Department) entered into a 2005 Consent Decree (2005 Decree), on February 15, 2005, to resolve alleged violations of the Montana Hazardous Waste Act (MHWa) and Administrative Rules of Montana (ARM). The 2005 Decree required Asarco to develop and implement yearly Work Plans designed to remove, store, and properly dispose or recycle all remaining hazardous waste and recyclable materials from identified process units located within Asarco's East Helena Plant. The department acknowledges that Asarco accomplished all of the activities contained in the 2005 Decree Work Plans, except for removing and properly disposing hazardous waste being stored in Subpart DD containment structures, cleaning the thawhouse building, and cleaning of certain portions of the acid plant contact section.

On October 2, 2007, Asarco and the Department entered into a 2007 Administrative Order on Consent (2007 Order), which allows Asarco to continue with the cleanup processes established under the Work Plan provisions of the 2005 Decree. The 2007 Order requires Asarco to develop and implement a yearly Work Plan for calendar years 2007-2012 to remove, store, and properly dispose or recycle all remaining hazardous waste and/or secondary material located in the process units, pollution control devices, and storage units and other identified areas of the facility. To the extent that Asarco disposes of hazardous waste and/or secondary material, it will do so either by removal to an approved CAMU at the facility or by removal to another facility according to proper regulatory procedures under MHWa or its regulations there under.

Asarco submitted and completed the provisions outlined in the August 2007 Cleaning and Demolition Work Plan, as further defined as the Phase IV, Stage 1 area. The March 2008 Comprehensive List of Process Units and Other Areas of Interest describes the past cleaning efforts already undertaken at the East Helena Plant. A copy of the March 2008 Comprehensive List of Process Units and Other Areas of Interest is attached as Appendix A. Asarco recognizes that this comprehensive list may need to be modified as a result of future investigations and/or inventories. This list does not necessarily constitute a complete inventory of areas of interest (AOIs) at the smelter complex, nor does it describe the current clean-up status at these areas. The Department shall maintain, on file, a complete inventory of AOIs and their current clean-up status. The 2008 Cleaning and Demolition Project Work Plan builds upon Asarco's past efforts for removing and properly managing materials.

The 2008 Cleaning and Demolition Project Work Plan describes the management activities scheduled for this calendar year. Asarco has selected URS/Cleveland Wrecking Company (URS/CWC) to conduct the 2008 Cleaning and Demolition Work Plan, which is contained within this submittal. For the

purposes of this 2008 Cleaning and Demolition Project Work Plan, the environmental cleaning, demolition, and handling procedures are primarily highlighted. URS/CWC will employ a systematic approach for cleaning, demolition, hauling, and disposition of the removed materials from identified process locations. The specific work practices associated with these activities are fully described within the accompanying URS/CWC Work Plan.

On February 26, 2008, Asarco submitted the Interim Measures Addendum Work Plan (Demolition Foot Print Exposed Areas Soil Sampling, Excavation, and Confirmatory Sampling Work Plan and Blast Furnace and Monier Flue Cleaning, Demolition, and Soil Sampling Work Plan) to EPA. The ability to execute this 2008 Cleaning and Demolition Project Work Plan is dependent upon sequencing the implementation of both Work Plans. EPA must provide approval of the Interim Measures Addendum Work Plan no later than May 1, 2008 for the 2008 Cleaning and Demolition Project Work Plan activities to proceed. If EPA approval is received on or before May 1, 2008, Asarco will mobilize and begin the 2008 Cleaning and Demolition Program on or before June 11, 2008.

To facilitate removal of material under this Work Plan, Asarco has prepared the following decision matrix table to determine the priority in managing removed material from the East Helena Plant.

#### DECISION MATRIX FOR MAJOR PROCESS LOCATIONS

Process Location	Criteria For Prioritizing Management of Recyclable material			
	Level of Contamination	Volume of Recyclable material	Degree of Exposure	Condition of Structures
Non-Production	Low	Low	Low	Good
Tanks	Low	Low	Moderate	Good
Ore Storage	Low	Low	Low	Good
Ore Receiving	Moderate	Moderate	Low	Good
Sinter Plant	Moderate	High	Low	Fair
Acid Plant	Moderate	Moderate	Low	Good
Blast Furnace	Moderate	Moderate	High	Fair
Dross Plant	High	High	Moderate	Good
Former Zinc Plant	High	Moderate	High	Poor
Water Treatment	Low	Moderate	Low	Good

The materials from the process locations that are shaded in the preceding matrix table were removed under the previous cleaning and demolition work plans, with the exception of the contact section of the acid plant, which is scheduled for cleaning and demolition in 2008. Based upon the process locations that have not been completed, Asarco proposes to focus the 2008 Cleaning and Demolition Project activities within the areas further described in the accompanying URS/CWC Work Plan.

## 2.0 PROJECT SUMMARY

---

### Phase IV, Stage 2 Work Areas

The Phase IV, Stage 2 work areas contain structures that are scheduled to be cleaned and demolished during calendar year 2008, as further described in the following table.

#### Phase IV, Stage 2

- |                              |  |
|------------------------------|--|
| ○ Blast Furnace Flue         | ○ Truck Loading & Spray Dryer Building |
| ○ Acid Plant Cooling Towers  | ○ Sand Filters                         |
| ○ 400' D&L Stack             | ○ 200' Acid Stack                      |
| ○ Acid Plant Contact Section | ○ Monier Flue                          |
| ○ Blast Furnace Baghouse     | ○ 425' Blast Furnace Stack             |
| ○ Ore Unloading Bins         | ○ Sample Mill                          |
| ○ Crushing Mill              | ○ Auto Shop                            |
| ○ Pump Tank Building         | ○ Main Blower Building                 |
| ○ Acid Plant Shop            | ○ Ringling Dust Building               |

Asarco originally anticipated including the cleaning and demolition of the blast furnace flue and Monier flue within the 2008 Cleaning and Demolition Project Work Plan. However, on March 29, 2007, EPA requested that Asarco prepare a separate interim measures (IM) work plan for these flue systems. On February 26, 2008, Asarco submitted an Interim Measures Work Plan Addendum (IMWPA) to EPA that included: 1) existing soil data, 2) demolition footprint exposed soils sampling, and 3) exposed soils removal criteria and confirmatory sampling. On May 8, 2008, Asarco submitted a revised IMWPA to EPA that reflected responses to EPA comments and to the technical discussions that took place on May 2, 2008 between Asarco, the Department, and EPA. On May 21 and 22, 2008, Asarco provided EPA with supplemental information to the revised IMWPA. On May 22, 2008, EPA approved the revised IMWPA. This IMWPA will govern all future actions within these flue systems.

## 3.0 MANAGEMENT OF REMOVED MATERIALS

---

To the extent that Asarco disposes of hazardous waste and/or secondary material, it will do so either by removal to the approved CAMU Phase 2 cell at the facility or by removal to another facility according to proper regulatory procedures under MHLWA or its regulations there under.

## 4.0 INTERIM MEASURE PROGRAM

---

On May 5, 1998, ASARCO and the United States Environmental Protection Agency (EPA) entered into a Consent Decree (RCRA Consent Decree, U.S. District Court, 1998) to initiate the corrective action process in accordance with the Resource Conservation and Recovery Act (RCRA) and the Clean Water Act (CWA). A major area of overlap between the RCRA Consent Decree and the Administrative Order on Consent involves the backfilling and interim capping of areas in which cleaning and demolition had occurred and where exposed soils were present.

Asarco intends to address the interim capping by:

- Identifying the locations in which backfilling using fumed slag may be required to achieve proper site stabilization and drainage prior to installing the interim cap;
- Presenting the locations that will require interim capping;
- Providing the interim capping techniques, procedures, and materials that will be used to inhibit infiltration of precipitation within the demolition areas; and
- Outlining the general, short-term maintenance for the interim cap.

The 2008 Cleaning and Demolition Project Work Plan involves removing structural components to existing building grade. The remaining features, including existing foundations and concrete slabs that are not removed, will be incorporated under an interim cap.

The areas subjected to 2008 Cleaning and Demolition Project Work Plan will undergo final cleaning (see Section 4.1). Select areas may be backfilled with fumed slag to achieve proper drainage prior to installing the interim cap (Section 4.2). The locations requiring interim capping will be identified (Section 4.3) and the techniques, procedures, and material used for installing will be outlined (Section 4.4). The general, short-term maintenance of the interim cap will be necessary to ensure integrity (Section 4.5).

#### **4.1 Final Cleaning Action**

The final cleaning of the 2008 Cleaning and Demolition Project will involve a three-phased approach. First, the exposed concrete footprint will undergo a rough cleaning using conventional scraping and shoveling methods. Although this cleaning technique provides an efficient method for removing residual materials, it cannot achieve the prescribed level of cleanliness. To supplement conventional cleaning methods, the concrete footprint will be mechanically swept. The use of the mechanical sweeper will remove surface materials that may not be completely removed using conventional cleaning techniques. Finally, the concrete footprint will be cleaned using a high-velocity vacuum. This final cleaning method will remove any fine material, particularly along the interfaces between the concrete floor and building columns, fan foundations, and support walls.

#### **4.2 Backfill Locations and Fumed Slag Composition**

Once final cleaning activities are complete, certain areas may be graded and, as necessary, backfilled to achieve proper drainage prior to placement of an interim cap. Asarco will use on-site fumed slag as backfill. The fumed slag may be placed in areas that are below grade or require drainage assistance. The fumed slag will serve as the subgrade for the interim cap, over which an engineered cap comprised of non-woven geotextile and RPE will be placed. The fumed slag has been used as a grading material at the plant site in the past and possesses good physical characteristics for fill or sub-foundation uses (granular material and compacts wells). Although fumed slag contains elevated total metal concentrations, the metals are bound in a silicate-iron matrix with characteristics of low metal leachability. The potential for metal migration from the fumed slag is low. In response to EPA's July 6, 2006 comments, Asarco provided the rationale for using fumed slag for backfilling purposes, including study results derived from the RCRA Consent Decree investigations. The slag-related investigative

results contained in the Current Condition Release Assessment (CC/RA, January 1999) and qualitative analyses of fumed slag (May 2001) are attached in Appendix B. In April 2005, Department representatives collected fumed slag samples from the East Helena Plant to assess the potential environmental impacts from its use as an iron substitute within the cement manufacturing industry. A copy of the Department's April 2005 fumed slag sampling event results is attached in Appendix B. A July 2006 Department Environmental Impact Statement (EIS) contains additional slag related information.

Most, but not all of the footings or similar structures encountered during the implementation of the Work Plan will be brought to grade. Most of the concrete, asphalt slabs, and some interior wall and/or footings will remain in place. The presence of above ground concrete, asphalt, walls, or footings will not compromise nor impair the ability to achieve proper drainage. It is anticipated that structures greater than three feet in height will remain following the 2008 cleaning and demolition phase of the project. The areas adjacent to these elevated structures will be contoured with fumed slag. This practice will minimize abrupt edges, facilitate the ability to place the interim cap, and reduce the potential for future liner damage.

Regardless of these efforts, the integrity of the cap may be affected by excessive wind or other condition beyond our control. The placement of additional sandbags and tethered vehicle tires over problematic cap areas will be employed to address liner displacement issues. On-going maintenance and repair of the interim cap will be employed (Section 4.5).

#### **4.3 Location of Interim Caps**

Once the required backfilling has occurred, certain areas will be capped to control drainage and potential infiltration from precipitation and run-on within the newly exposed footprints. The described capping is considered a precautionary, interim measure. The capping techniques, procedures, and materials are designed to control drainage, potential infiltration, and run-on until the final cover system is constructed. Although the capping program is interim, it is possible that many of the features such as placement of the fill material and interim caps will remain in place even after a final remedy is implemented. Sheet number 13 of the attached URS/CWC 2008 Cleaning and Demolition Work Plan illustrates the areas in which interim capping will be placed following the 2008 cleaning and demolition.

#### **4.4 Interim Cap Techniques, Procedures and Materials**

Interim caps will be constructed within certain exposed footprints in the demolition areas. The interim cap details and specifications are illustrated within the attached URS/CWC 2008 Cleaning and Demolition Work Plan, Sheet number 14. In general, from the top down, the interim cap will consist of the following:

- Sand bags to hold down the interim cover during windy periods;
- A 24-mil reinforced polyethylene (RPE) with the PRE seams overlapped 3 inches and sewn;
- A minimum 10 ounce non-woven geotextile;
- A prepared sub-grade consisting of fumed slag fill for grading purposes; and
- Existing soils, concrete slabs and/or concrete foundations.

## **4.5 Maintenance of Interim Cap**

### **4.5.1 Site Inspection**

Periodic inspections of the interim cap will be conducted to ensure that the interim cap systems are performing adequately and to identify problems and provide proper maintenance of interim cap systems. The inspection program will involve three types of inspections: (1) informal inspections, (2) periodic technical inspections, and (3) special inspections after extreme events.

The informal inspection is actually a continuing effort by on-site personnel, performed in the course of their normal duties. Periodic technical inspections and inspections after extreme events will be performed by onsite Asarco staff (or other technical representatives) familiar with the design and construction of the capping systems. The periodic technical inspection will be performed monthly to document the condition of the cap components. Special inspections are very similar to periodic technical inspections but are performed only after an extreme event such as a rare rainstorm, tornado, or earthquake.

The inspection of the interim cap system will typically involve walking the entire site in a systematic fashion that ensures a comprehensive review. If any problem or deficiency is found, the inspector should record the location on a field sketch. A complete description of the affected area, including all pertinent data (i.e., size of the area and other descriptive remarks such as exposed synthetic materials) should be recorded on the appropriate reporting forms. An accurate and detailed description of observed conditions will enable a meaningful comparison of conditions observed at different times.

Photographs may be helpful in documenting problems. Provisions should be made to keep a photographic log of problems, repairs, and general site conditions. This log will provide valuable information when evaluating the performance of the interim cap system and when planning repair strategies.

It is important to have a record of site conditions at various stages after capping. Good documentation will provide valuable information to help maintenance and repair planning. Inspection checklists to assist in the inspection and documentation procedures should be developed and modified as needed throughout the interim capping period. The checklist will (at a minimum) contain items to evaluate such as membrane condition, sand bag condition, liner seams, liner/concrete attachments and site drainage. A copy of an example inspection form is attached in Appendix C.

### **4.5.2 Site Security**

The interim cap will be contained within the fenced Asarco facility and will be kept secured so that people or animals do not disturb the interim cap. Site access by ongoing plant or demolition operations will be limited through the use of barricades, barrier tape, or temporary fencing. Plant personnel will advise contractors conducting site activities of access limits within or near capped areas.

### **4.5.3 Site Maintenance**

As shown in Table 4-1, there are four different types of maintenance tasks listed by priority rather than by frequency. Table 4-1 is provided as a guide to prioritize the different types of maintenance activities

in proper perspective. The different types of maintenance are also discussed in the following subsections.

**TABLE 4-1. PRIORITY OF MAINTENANCE TASKS**

Priority	Type of Maintenance	Description and Example
1	Emergency	A situation requiring immediate attention (for example, fire or flood).
2	Preventative	Scheduled inspection and minor repairs carried out during inspection (for example, cleaning of membrane liner).
3	Corrective	Corrective maintenance required as a direct result of scheduled inspection (for example, repair of torn membrane liner).
4	Housekeeping	Routine housekeeping of buildings and grounds (for example, disposal of debris and general housekeeping).

1. Emergency maintenance - Emergencies are situations arising unexpectedly that require urgent attention. Often, immediate response must be provided to avert potential serious damage. Provisions for emergency repair/damage control activities must therefore be in-place prior to the occurrence. Toward this end, an Emergency Contacts list will be prepared and kept current, and include local emergency response organizations, assigned maintenance personnel, and agency and owner representatives. Table 4-2 provides a partial list of emergency contacts.
2. Preventative maintenance - Preventative maintenance will be performed to extend the life of equipment and structures. With the exception of routine surveillance and inspections, preventative maintenance tasks should be scheduled in accordance with the recommendations of the material and equipment manufacturers. Scheduled inspection and maintenance of all site facilities will help ensure that potential problems are discovered and corrected before they become serious, as well as providing for the performance of periodically required upkeep. During routine inspections, the Asarco personnel should be alert for any abnormal conditions, which could indicate potential problems.
3. Corrective maintenance - Corrective maintenance consists of repair and other non-routine maintenance. Asarco personnel must always be ready to handle these tasks as the need arises. Corrective maintenance procedures should follow the equipment or material manufacturer's recommendations. In planning for the corrective maintenance, arrange for the assistance of an engineer or manufacturer's representative, if necessary.
4. Housekeeping - Maintaining well-kept facilities indicates pride on the part of the Asarco personnel, and provides for good and efficient operations. Well-kept property cultivates good neighbor relations with adjacent property owners. Housekeeping tasks may include collecting/disposing of litter or debris and maintaining access barriers.

**TABLE 4-2. EMERGENCY NOTIFICATION CONTACTS AND PHONE NUMBERS**

<b>General Emergency Numbers</b>	
Fire Department	911
Ambulance	911
Police	911
<b>Corporate Resources</b>	
ASARCO LLC	
Blaine Cox (East Helena Smelter)	(406) 227-4098
Jon Nickel (East Helena Smelter)	(406) 227-4529
<b>Other Resources</b>	
U.S. EPA (24-hour emergency)	(206) 553-1263
Superfund/RCRA Hotline	(800) 424-9346
Hydrometrics, Inc.	(406) 443-4150

#### **4.6 Departmental Inspections and Confirmation**

Asarco will notify the Department within five (5) working days after removal of the material and demolition a specific process unit or areas has been completed. The purpose of this notification is to request that the Department, through its oversight authority, inspect and confirm that the cleaning activity has been performed in accordance with the Work Plan.

These notifications and inspections will allow the Department to document that Asarco has fulfilled all the conditions of the 2007 Order, of which the 2008 Cleaning and Demolition Project Work Plan is a part. The Comprehensive List of Process Units and Other Areas of Interest will be regularly updated after the Department inspects the process units or locations.

### **5.0 REPORTING**

---

#### **5.1 Quarterly Reporting**

Asarco intends to begin the work outlined in this Work Plan on or before June 11, 2008. Within 30 days after each calendar quarter (no later than July 31, 2008, October 31, 2008, and, if necessary, January 31, 2009), Asarco will submit quarterly reports that contain the following information:

- a. A description of the portion of the Work Plan completed;
- b. Summaries of all deviations from the approved Work Plan during the reporting period;
- c. Summaries of all problems or potential problems encountered during the reporting period;
- d. Projected work for the next reporting period;
- e. Documentation of all shipments of recyclable material and hazardous waste off-site including shipping papers such as manifests (if required); and
- f. Description of each shipment of reclaimed or recycled material made during the preceding quarter indicating how the material is managed, handled, or treated for recovery or recycling that demonstrates that it has value. The information to be submitted to the Department in making a successful stewardship demonstration is: (1) acceptance criteria required by the



receiving facility (expressed as a minimum threshold of recoverable metals and maximum allowable toxic metals), (2) a demonstration that the receiving facility is in compliance with all applicable environmental requirements, (3) a copy of the contractual agreement between Asarco, its broker and the receiving facility, (4) the name of the state or provincial regulatory contact and facility contact.

Quarterly reports will not be required after submittal of the 2008 Work Plan Completion Report.

## 5.2 Annual Reporting

Within thirty (30) days, but, no later than January 31, 2009, after Asarco concludes that it has fully implemented the materials removal outlined in the 2008 Cleaning and Demolition Work Plan, Asarco shall submit a 2008 Work Plan Completion Report to the Department. The contents of the Work Plan Completion Report will include:

- a. A description of the cleaning efforts conducted;
- b. If applicable, documentation of all shipments of recyclable materials and/or hazardous wastes;
- c. Summaries of all problems or potential problems encountered during the reporting period; and
- d. Certification that the Work Plan has been fully implemented.

## 6.0 REFERENCES

---

ASARCO LLC, 2008. ASARCO East Helena Smelter 2008 Interim Measures Work Plan Addendum, Blast Furnace Flue and Monier Flue Cleaning and Demolition and Demolition Foot Print Exposed Areas Soil Sampling, Revised May 2008.

Hydrometrics, Inc., 1999. Interim Measures Work Plan, East Helena Facility, April 1999, Revised July 1999. Includes Volume II, Corrective Action Management Unit Design Report.

Hydrometrics, Inc., 2000. RCRA Facility Investigation Work Plan, East Helena Facility, March 2000.

## FIGURES

**2008 CLEANING AND DEMOLITION PROJECT  
ASARCO EAST HELENA PLANT**

**2008 WORK PLAN**

**APPENDIX A**

**March 2008**

**COMPREHENSIVE LIST OF PROCESS UNITS  
AND OTHER AREAS OF INTEREST (AOIs) (MARCH 2008)**

Asarco East Helena Plant  
Comprehensive List of Process Units and Other Areas of Interest (AOI)  
Updated March 2008

Location	Operational Status	Has Cleanup Been Completed	Date of Cleanup and/or Demolition	State Inspection/ Confirmation
<b>NON-PRODUCTION AREAS</b>				
Paint Shop	Not In Use	Not Required	Not Required	10/29/2003
Paint Storage Area	Storage	Not Required	Not Required	2/23/2004
Methanol Storage	Storage	Not Required	Not Required	10/29/2003
Motor Storage Shop	Storage	Not Required	Not Required	10/29/2003
High Lead Welding	Not In Use	Not Required	Not Required	10/29/2003
Sweeper Garage	Storage	Not Required	Not Required	10/29/2003
Laboratory	Storage	Yes	7/13/2004	2/23/2004
	Demolished	November 2006		11/15/2006
Laboratory Storage	Storage	Not Required	Not Required	2/23/2004
	Demolished	November 2006		11/15/2006
Sanitary Sewer Plant	Not In Use	Not Required	Not Required	10/29/2003
Acid Plant Shop	Storage	Not Required	Not Required	4/7/2004
Carpenter Shop	Not In Use	Not Required	Not Required	10/29/2003
Main Shop	In Use	Not Required	Not Required	10/29/2003
Auto Shop	In Use	Not Required	Not Required	10/29/2003
Warehouse	Storage	Not Required	Not Required	4/7/2004
Warehouse Pad	Storage	Not Required	Not Required	4/7/2004
Warehouse Chemical Accum.	Storage	Yes	7/13/2004	4/7/2004
Powerhouse	In Use	Not Required	Not Required	4/7/2004
Blacksmith Shop	Not In Use	Not Required	Not Required	10/29/2003
Brick Shed	Not In Use	Not Required	Not Required	10/29/2003
Used Oil Storage	In Use	Not Required	Not Required	10/29/2003
Hazardous Waste Accumulation at 97 Bins	In Use	Not Required	Not Required	10/29/2003
97 Bins	In Use	Not Required	Not Required	10/29/2003
Guzzler Vacuum System	In Use	Not Required	Not Required	4/7/2004
Contractor's Lunchroom	Demolished	Yes	Fall 2007	9/14/2007
Storage Garage	Demolished	Yes	Fall 2007	9/14/2007
Contractor's Changeroom	Demolished	Yes	Fall 2007	9/14/2007
Main Office	Demolished	Yes	Fall 2007	9/14/2007
Natural Gas Valve House	Demolished	Yes	Fall 2007	9/14/2007

Location	Operational Status	Has Cleanup Been Completed	Date of Cleanup and/or Demolition	State Inspection/ Confirmation
TANKS				
Speiss Tank	Demolished	Yes	7/22/2003 8/8/2005 Fall 2006	8/28/2003  11/15/2006
Stormwater Tank		In Use	Yes	7/21/2003 and 8/16/2004
Thornock Tank	In Use	Yes	7/22/2003	8/28/2003
Million Gallon Tanks	In Use	Yes	7/23/2003 and 8/15/2004 9/1/2005 (west)	4/7/2004
Clarified Water Tanks	In Use	Yes	Summer 2002	4/7/2004
Equalization Tank	In Use	Yes	Summer 2002	4/7/2004
Truck Scale Storm Sump	In Use	Yes	7/25/2003 and 8/19/2004 8/8/2005	4/7/2004
Truck Gate Storm Sump	In Use	Yes	7/21/2003	4/7/2004
Thawhouse Storm Sump	In Use	Yes	7/21/2003 8/8/2005	4/7/2004
Baghouse Storm Sump	In Use	Yes	7/25/2003 and 8/19/2004	
G-Pan Storm Sump	Under Cap	Yes	7/22/2003 and 8/20/2004	4/7/2004
			Fall 2006	11/15/2006
Footnote: The schedule for cleaning all stormwater tanks and sumps is governed by the amount of sediment accumulation over a given period of time.				

Location	Operational Status	Has Cleanup Been Completed	Date of Cleanup and/or Demolition	State Inspection/ Confirmation
<b>ORE STORAGE AREAS</b>				
Thawhouse Building	Demolished	Yes	Fall 2007	10/29/2003
Coverall Buildings - Barnum Building  - Bailey Building	In Use Storage of Demolished Waste	No	Vacuum/Wash-down in 2002 Prior to Lease Pending	10/29/2003
Additional cleaning following removal of waste material to CAMU				
Ringling Building	In Use	Yes	Summer 2002	10/29/2003
Ore Storage Yard	In Use	Not Required	Not Required	4/7/2004
High Grade Building	Not In Use	Yes	Summer 2002	10/29/2003
Hopto Unloading Bins	Not In Use	Yes	Summer 2002	10/29/2003
Direct Smelt Building	In Use	Yes	Summer 2002	10/29/2003
Printed Circuit Board Process	Never Used	Not Required	Not Required	10/29/2003
Footnote: The Direct Smelt Building is use to store road sand, mobile equipment, accumulated HDS filter cake, and CAMU ACM prior to shipping for disposal.				

Location	Operational Status	Has Cleanup Been Completed	Date of Cleanup and/or Demolition	State Inspection/ Confirmation
<b>ORE RECEIVING</b>				
Former Crushing Mill	Not In Use	Yes	Summer 1998	4/7/2004
Sample Mill	Not In Use	Not Required	Not Required	4/7/2004
Sample Mill Baghouse Hopper	Not In Use	Yes	8/12/2003	8/28/2003 and 4/7/2004
New Crushing Mill Office	Not In Use	Not Required	Not Required	10/29/2003
New Crushing Mill Floor	Not In Use	No		10/29/2003
New Crushing Mill Belts	Not In Use	No		10/29/2003
New Crushing Mill Baghouse Hopper	Not In Use	Yes	8/5/2003	8/28/2003 10/29/2003
CSHB Truck Bins	Not In Use	No		10/29/2003
A-Conveyor Belt	Not In Use	No		10/29/2003
A-Conveyor Belt Gallery	Not In Use	No		10/29/2003
A-Conveyor Ventilation Pipe	Not In Use	No		10/29/2003
Door to A-Conveyor Vent. Pipe	Not In Use	No		10/29/2003
CSHB Feeders	Not In Use	No		10/29/2003
CSHB Under Feeders	Not In Use	No		10/29/2003
CSHB Feeder Tops	Not In Use	No		10/29/2003
CSHB Tracks	Storage of Waste	No		10/29/2003
CSHB Main Bins	Not In Use	No		10/29/2003
CSHB Office	Not In Use	Not Required	Not Required	10/29/2003
CSHB Crane Decks	Not In Use	No		
CSHB Bin 13	Not In Use	Yes	Summer 2002	8/28/2003
CSHB Bin 14	Not In Use	No		10/29/2003
CSHB Bin 15	Not In Use	No		10/29/2003
CSHB Bin 16	Not In Use	Yes	6/26/2003	8/28/2003
CSHB North Baghouse Hopper	Not In Use	Yes	8/6/2003	8/28/2003
CSHB South Baghouse Hopper	Not In Use	Yes	8/7/2003	8/28/2003
CSHB Feeder Baghouse Hopper	Not In Use	Yes	8/11/2003	8/28/2003
No. 6 Baghouse Hopper	Not In Use	Yes	8/11/2003	8/28/2003
CSHB Stack Base	Not In Use	Found Clean	Not Required	8/28/2003
Dustmaster Tank	Not In Use	Yes	8/14/2003	8/28/2003
CSHB I-Bin	In Use Storage of Waste	No	Pending	4/7/2004 12/22/2004 6/23/2005 9/1/2005

Footnote: The CSHB (concentrate storage and handling building) and new crushing mill underwent extensive mechanical cleaning during the summers of 2001 and 2002. Unfortunately, some of these areas have not been adequately cleaned to meet work plan criteria. Therefore, these areas are assumed to require additional cleaning.

Location	Operational Status	Has Cleanup Been Completed	Date of Cleanup and/or Demolition	State Inspection/ Confirmation
<b>SINTER PLANT</b>				
Hammer Mill	Demolished	Yes	September 2006	10/29/03,11/15/06
B-Conveyor Belt	Demolished	Yes	September 2006	10/29/03,11/15/06
B-Conveyor Belt Gallery	Demolished	Yes	September 2006	10/29/03,11/15/06
Nodulizer	Demolished	Yes	September 2006	10/29/03,11/15/06
C-Belt Conveyor	Demolished	Yes	September 2006	10/29/03,11/15/06
Ignition Hopper	Demolished	Yes	September 2006	10/29/03,11/15/06
Feed Hopper	Demolished	Yes	September 2006	10/29/03,11/15/06
1st Deck Ventilation Pipe	Demolished	Yes	September 2006	10/29/03,11/15/06
Sinter Machine	Demolished	Yes	September 2006	10/29/03,11/15/06
Sinter Machine Access	Demolished	Yes	September 2006	10/29/03,11/15/06
Pallet Room	Demolished	Yes	September 2006	10/29/03,11/15/06
2nd Deck Cleanout Chutes (2)	Demolished	Yes	September 2006	10/29/03,11/15/06
2nd Deck Windboxes (11)	Demolished	Yes	September 2006	10/29/03,11/15/06
2nd Deck Ventilation Pipe	Demolished	Yes	September 2006	10/29/03,11/15/06
Fan Deck Oil Room	Demolished	Yes	September 2006	10/29/03,11/15/06
1A Pan	Demolished	Yes	September 2006	10/29/03,11/15/06
1 Pan	Demolished	Yes	September 2006	10/29/03,11/15/06
2 Pan	Demolished	Yes	September 2006	10/29/03,11/15/06
3 Pan	Demolished	Yes	September 2006	10/29/03,11/15/06
4 Pan	Demolished	Yes	September 2006	10/29/03,11/15/06
F-Belt Conveyor	Demolished	Yes	September 2006	10/29/03,11/15/06
F-Belt Conveyor Gallery	Demolished	Yes	September 2006	10/29/03,11/15/06
Elevator	Demolished	Yes	September 2006	10/29/03,11/15/06
G-Pan	Demolished	Yes	September 2006	10/29/03,11/15/06
E-Belt	Demolished	Yes	September 2006	10/29/03,11/15/06
Smooth Rolls	Demolished	Yes	September 2006	10/29/03,11/15/06
Spike Rolls	Demolished	Yes	September 2006	10/29/03,11/15/06
Returns Tank	Demolished	Yes	September 2006	10/29/03,11/15/06
Vibrating Conveyor	Demolished	Yes	September 2006	10/29/03,11/15/06
Sinter Storage Bin	Demolished	Yes	September 2006	4/7/2005 10/29/03,11/15/06
Coke Storage Bin	Demolished	Yes	September 2006	4/7/2005 10/29/03,11/15/06
Sinter Basement	Demolished	Yes	September 2006	10/29/03,11/15/06
Larry Pit	Demolished	Yes	September 2006	10/29/03,11/15/06
Numbers 1,2,3,4,and 5 Fan Housing	Demolished	Yes	September 2006	10/29/03,11/15/06



Location	Operational Status	Has Cleanup Been Completed	Date of Cleanup and/or Demolition	State Inspection/ Confirmation
<b>SINTER PLANT (continued)</b>				
Weak Gas Ventilation Flue System	Demolished	Yes	September 2006	10/29/03,11/15/06
Strong Gas Ventilation Flue System	Demolished	Yes	Summer 2006	10/29/03,11/15/06
Baghouse Fan	Demolished	Yes	Summer 2006	10/29/03,11/15/06
Hot Cottrell Fan	Demolished	Yes	Summer 2006	10/29/03,11/15/06
Ignition Furnace Fan	Demolished	Yes	Summer 2006	10/29/03,11/15/06
Downdraft Fan	Demolished	Yes	Summer 2006	10/29/03,11/15/06
Cyclones	Demolished	Yes	Summer 2006	10/29/03,11/15/06
Crushing Circuit Ventilation System	Demolished	Yes	Summer 2006	11/15/06
No. 7 Baghouse Hopper	Not In Use	Yes	3/3/2003	8/28/2003
No. 8 Baghouse Hopper	Not In Use	Yes	3/3/2003	8/28/2003
Sinter Plant Baghouse Hoppers	Demolished	Yes	3/3/2003	8/28/03, 11/15/06
Sinter Storage Building Ledges, Roof, and Ventilation	Not In Use	Yes	9/15/2004	8/28/2003
Sinter Storage Building Floor	Not In Use	Yes	8/21/2003	8/28/2003
Stack Interior/Base	Not In Use	Yes	November 2007	

Location	Operational Status	Has Cleanup Been Completed	Date of Cleanup and/or Demolition	State Inspection/ Confirmation
<b>ACID PLANT</b>				
Hot Cottrell Hoppers	Demolished	Yes	Fall 2006	8/28/03, 11/15/06
Hot Cottrell Building	Demolished	Yes	Fall 2006	4/7/04, 11/15/06
Hot Cottrell Inlet Header	Demolished	Yes	Fall 2006	4/7/04, 11/15/06
Hot Cottrell Outlet Header	Demolished	Yes	Fall 2006	4/7/04, 11/15/06
Scrubber Tower Ductwork	Demolished	Yes	Fall 2006	4/7/04, 11/15/06
Scrubber Towers	Demolished	Yes	3/5/03, Fall 2006	8/28/03, 11/15/06
Mist Precipitator Ductwork	Demolished	Yes	Fall 2006	4/7/04, 11/15/06
Mist Precipitator Base	Demolished	Yes	2/25/03, Fall 2006	8/28/03, 11/15/06
Mist Precipitator Floor Sump	Demolished	Yes	Fall 2006	4/7/04, 11/15/06
Pump Tanks	Not In Use	Yes	2/26/03	8/28/03, 11/15/06
Heat Exchangers	Not In Use	No	Fall 2006	4/7/04
Tail Gas Ductwork	Not In Use	No		4/7/04
Tail Gas Stack Interior/Base	Not In Use	Yes	November 2007	4/7/2004
Acid Dust Bin/Building	Demolished	Yes	3/5/03, Fall '06	8/28/03, 11/15/06
93% Acid Storage Tanks	Not In Use	Yes	Oct./Nov. 2005	4/7/2004
93% Dry/Intermediate/Final Tower Tanks (3 Tanks)	Not In Use	Yes	Oct./Nov. 2005	4/7/2004 6/23/2005
98% Acid Storage Tank	Demolished	Yes	Oct./Nov. 2005	4/7/04, 11/15/06 6/23/2005 9/1/2005
Decolorization Acid Tanks	Not In Use	Yes	Oct./Nov. 2005	6/23/2005
Hydrogen Peroxide Tanks	Empty	Not Required	Not Required	4/7/2004
Converter Catalyst	Mothballed	Not Required	Not Required	4/7/2004
Acid Cooling Tower Base	Not In Use	Yes	Summer 2002	4/7/2004
Acid Dust Recovery Building	Demolished	Yes	Fall 2006	4/7/04, 11/15/06
80 Ton Dust Recovery Tank	Demolished	Yes	Fall 2006	4/7/04, 11/15/06
Hot Cottrell Access Piping	Demolished	Yes	Fall 2006	4/7/04, 11/15/06
Footnote: The strong acid contained in acid plant storage vessels was removed during the fourth quarter 2005.				

Location	Operational Status	Has Cleanup Been Completed	Date of Cleanup and/or Demolition	State Inspection/ Confirmation
<b>BLAST FURNACE</b>				
Matte Breaking Building (Old)	Not In Use	Yes	8/23/2005	10/29/03, 4/7/05 6/23/05, 9/1/05
Matte Breaking Building (New)	Not In Use	Found Clean	Not Required	10/29/03, 4/7/05
Highline 47 Feeder Belts	Not In Use	Yes	10/11/2004	10/29/03, 4/7/05 6/23/2005
	Demolished	Yes	Summer 2007	9/14/2007
Highline 47 Open Bins	Not In Use	Yes	9/11/03,10/15/04	10/29/03, 4/7/05
	Demolished	Yes	Summer 2007	9/14/2007
Highline Storage Bins	Not In Use	Yes	Summer 2001	10/29/03, 4/7/05
	Demolished	Yes	Summer 2007	9/14/2007
Portland Cement Silo	Not In Use	Yes	9/3/2003	10/29/03,4/7/05
Blast Furnace Dust Silo	Not In Use	Yes	Summer 2001	4/7/2005
Blast Charge Floor	Not In Use	Yes	8/15/2004	10/29/03, 4/7/05
	Demolished	Yes	Summer 2007	9/14/2007
Scrap Conveyor	Demolished	Yes	9/20/2004	4/7/2005
				6/23/2005
Outside Blast Flue	Not In Use	Yes	10/20/2004	4/7/2005
Blast Feed Floor	Not In Use	Yes	11/10/2004	4/7/2005
	Demolished	Yes		9/14/2007
Blast Ventilation/Process Gas System	Not In Use	Yes	11/10/2004	4/7/2005
	Demolished	Yes	Summer 2007	9/14/2007
Blast Agglomerator Building	Demolished	Yes	8/26/2003	10/29/2003
Blast Agglomerator Feed Tank	Demolished	Yes	Summer 2001	10/29/2003
No. 1 Blast Tapping Floor	Not In Use	Yes	12/05/2004	10/29/03, 4/7/05 6/23/2005
	Demolished	Yes	Fall 2007	9/14/2007
No. 3 Blast Tapping Floor	Not In Use	Yes	12/05/2004	10/29/03, 4/7/05 6/23/2005
	Demolished	Yes	Fall 2007	9/14/2007
No.1 and 3 Crucible	Not In Use	Not Required	Not Required	4/7/2005 6/23/2005
	Demolished	Yes	Fall 2007	9/14/2007
Motor Switch Tracks	Not In Use	Yes	12/10/2004	4/7/2005
				6/23/2005
No.1/3 Blast Furnace Flue	Not In Use	Yes	12/2005	6/23/05, 12/22/05,1/9/06
	Demolished	Yes	Fall 2007	9/14/2007
Blast Furnace Flue	Not In Use	Yes	Summer 2002	
Blast Furnace Flue Crossover	Not In Use	No		
Monier Flue at Baghouse Inlet	Not In Use	Yes	Third Qrt. 2005	6/23/2005, 9/1/2005,
				9/16/2005,

Location	Operational Status	Has Cleanup Been Completed	Date of Cleanup and/or Demolition	State Inspection/ Confirmation
<b>BLAST FURNACE (continued)</b>				
Blast Baghouse Cellars	Not In Use	Yes	Summer 2001	
Blast Baghouse Thimble Floor	Not In Use	No		
Blast Furnace Dust Cleanout Baghouse Hopper	Not In Use	No		
Blast Furnace Dust Cleanout	Not In Use	No		
Railroad Loadout Baghouse	Never Used	Not Required	Not Required	
Blast Stack Base	Not In Use	Yes	November 2007	

Location	Operational Status	Has Cleanup Been Completed	Date of Cleanup and/or Demolition	State Inspection/ Confirmation
<b>DROSS PLANT</b>				
Speiss Long Pit	Demolished	Yes	Sum '02, Fall '06	6/23/05, 11/15/06
Speiss Short Pit	Demolished	Yes	Sum '02, Fall '06	6/23/05, 11/15/06
Under Reverb Furnace	Demolished	Yes	Fall 2006	6/23/05, 11/15/06
No. 4 Kettle Setting	Demolished	Yes	Fall 2006	6/23/05, 11/15/06
Under Kettle Floor	Demolished	Yes	Fall 2006	2/23/04, 11/15/06
Kettles	Demolished	Yes	Fall 2006	2/23/04, 11/15/06
Kettle Settings	Demolished	Yes	Fall 2006	2/23/04, 11/15/06
Ventilation System	Demolished	Yes	Fall 2006	2/23/04, 11/15/06
Lead Granulator	Demolished	Yes	Fall 2006	2/23/04, 11/15/06
Lead Granulator Belt	Demolished	Yes	Fall 2006	2/23/04, 11/15/06
Dross Furnace Upper Deck	Demolished	Yes	Fall 2006	11/15/2006
On Kettle Floor	Demolished	Yes	Fall 2006	11/15/2006
Dross Bullion Floor	Demolished	Yes	Fall 2006	2/23/04, 11/15/06
Speiss Pit Doors	Demolished	Yes	9/15/03, Fall '06	2/23/04, 11/15/06
Lead Pots	Demolished	Yes	Fall 2006	2/23/04, 11/15/06
Dross Reverb Furnace	Demolished	Yes	Fall 2006	2/23/04, 11/15/06
Dross Plant Crane Deck	Demolished	Yes	Fall 2006	2/23/04, 11/15/06
Dross Plant Floor	Demolished	Yes	Fall 2006	2/23/04, 11/15/06
Speiss Cleanout Bin	Demolished	Yes	Sum '02, Fall '06	2/23/04, 11/15/06
Router Dust Tank	Demolished	Yes	9/16/03, Fall '06	2/23/04, 11/15/06
Dross Plant Baghouse Hoppers	Demolished	Yes	2/24/2003 Fall 2007	2/23/04 9/14/2007
Dross Plant Stack	Demolished	Yes	9/15/2003 Fall 2007	2/23/04 9/14/2007

Location	Operational Status	Has Cleanup Been Completed	Date of Cleanup and/or Demolition	State Inspection/ Confirmation
<b>FORMER ZINC PLANT</b>				
Tetrahedrite Drying and Baghouse	Demolished	Not Required	Not Required	4/7/2004 and 9/24/2004
Former Zinc Furnace	Demolished	Not Required	Not Required	4/7/2004
Former Zinc Furnace Retaining Wall	Cleaned & Demolished	Yes	11/23/2004	8/8/03, 4/7/04 9/24/04, 1/27/05
Zinc Plant Holding Furnace	Cleaned & Demolished	Yes	8/8/2005	6/23/2005 9/1/2005
Zinc Plant Balloon Flue	Cleaned & Demolished	Yes	10/24/2004	8/8/03, 4/7/04 9/24/04, 1/27/05
Zinc Plant Cooling Tubes	Cleaned & Demolished	Yes	10/30/2004	8/8/03, 4/7/04 9/24/04, 1/27/05
Zinc Plant Main Railcar Loadout	Cleaned & Demolished	Yes	11/12/2004	8/8/03, 4/7/04 9/24/04, 1/27/05
Zinc Plant Baghouse	Cleaned & Demolished	Yes	12/10/2004	8/8/03, 4/7/04 9/24/04, 10/28/04 1/27/05
Zinc Plant Baghouse Bags	Cleaned & Demolished	Yes	7/13/2004	8/8/03, 4/7/04 9/24/04, 10/28/04
Zinc Plant Loadout Building	Cleaned & Demolished	Yes	12/1/2004	8/8/03, 4/7/04 9/24/04, 1/27/05
Zinc Plant Stack	Demolished	Yes	1/24/2005	1/27/2005

Location	Operational Status	Has Cleanup Been Completed	Date of Cleanup and/or Demolition	State Inspection/ Confirmation
<b>WATER TREATMENT</b>				
Scrubber Blowdown Recirculation Tanks	Not In Use	Yes	12/14/2004	1/27/2005
Scrubber Blowdown Clarifier	Not In Use	Yes	12/17/2004	1/27/2005
Soda Ash Tank and Feed System	Not In Use	Yes	12/10/2004	1/27/2005
Sludge Storage Tank	Not In Use	Yes	12/13/2004	1/27/2005
Sulfur Dioxide Stripper	Not In Use	Yes	12/16/2004	1/27/2005
Neutralization Building Tank	Not In Use	Yes	12/20/2004	1/27/2005
Neutralization Building Plate Clarifier	Not In Use	Yes	12/20/2004	2/23/2004 1/27/2005
Filter Press Water Holding Tank	Not In Use	Yes	12/22/2004	1/27/2005
Neutralization Building Surge Tank	Not In Use	Yes	12/22/2004	2/24/2004 1/27/2005
Filter Press Discharge Tank	Not In Use	Yes	12/8/2004	1/27/2005
HDS Water Treatment	In Use	Not Required	Not Required	2/23/2004
Sludge Recovery Operations	In Use	Not Required	Not Required	2/23/2004
Carwash Equipment Washdown	In Use	Not Required	Not Required	2/23/2004
HERO Facility	Never Used	Not Required	Not Required	2/23/2004

**2008 CLEANING AND DEMOLITION PROJECT  
ASARCO EAST HELENA PLANT**

**2008 WORK PLAN**

**APPENDIX B**

**March 2008**

**FUMED SLAG ANALYTICAL DATA**



## ANALYTICAL SUMMARY REPORT

May 02, 2005

Iver Johnson

MT DEQ

PO Box 200901

Helena, MT 59620

COPY

RECEIVED

MAY 05 2005

Dept. of Enviro. Quality  
Waste & Underground  
Tank Management Bureau

Workorder No.: H05040130

Project Name: ASARCO Slag Pile

Energy Laboratories Inc received the following 10 samples from MT DEQ on 4/14/2005 for analysis.

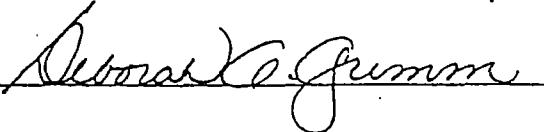
Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H05040130-001	ASP01-B3	04/14/05 14:15	04/14/05	Solid	Metals by ICP/ICPMS, Total Mercury in Solid By CVAA Digestion, Total Metals Digestion, Mercury by CVAA
H05040130-002	ASP02-B5	04/14/05 14:21	04/14/05	Solid	Same As Above
H05040130-003	ASP03-B14	04/14/05 14:28	04/14/05	Solid	Metals by ICP/ICPMS, Total Chloride, Sulfate Mercury in Solid By CVAA Moisture Moisture Polychlorinated Biphenyls (PCB's) pH Digestion, Total Metals Digestion, Mercury by CVAA Saturated Paste Extraction Sonication Extraction Soil Sonication Extraction Semi-Volatile Organic Compounds, PAHs Volatile Organics, Methanol Extraction 8260-Volatile Organic Compounds - Short List
H05040130-004	ASP04-C4	04/14/05 14:37	04/14/05	Solid	Metals by ICP/ICPMS, Total Mercury in Solid By CVAA Digestion, Total Metals Digestion, Mercury by CVAA
H05040130-005	ASP05-C9	04/14/05 14:44	04/14/05	Solid	Metals by ICP/ICPMS, Total Chloride, Sulfate Mercury in Solid By CVAA Moisture Moisture Polychlorinated Biphenyls (PCB's) pH Digestion, Total Metals Digestion, Mercury by CVAA Saturated Paste Extraction Sonication Extraction Soil Sonication Extraction Semi-Volatile Organic Compounds, PAHs Volatile Organics, Methanol Extraction 8260-Volatile Organic Compounds - Short List

H05040130-006	ASP06-D16	04/14/05 14:50 04/14/05	Solid	Metals by ICP/ICPMS, Total Mercury in Solid By CVAA Digestion, Total Metals Digestion, Mercury by CVAA
H05040130-007	ASP07-F3	04/14/05 14:57 04/14/05	Solid	Same As Above
H05040130-008	ASP08-G2	04/14/05 15:04 04/14/05	Solid	Metals by ICP/ICPMS, Total Chloride, Sulfate Mercury in Solid By CVAA Moisture Moisture Polychlorinated Biphenyls (PCB's) pH Digestion, Total Metals Digestion, Mercury by CVAA Saturated Paste Extraction Sonication Extraction Soil Sonication Extraction Semi-Volatile Organic Compounds, PAHs Volatile Organics, Methanol Extraction 8260-Volatile Organic Compounds - Short List
H05040130-009	ASP09-G4	04/14/05 15:07 04/14/05	Solid	Metals by ICP/ICPMS, Total Mercury in Solid By CVAA Digestion, Total Metals Digestion, Mercury by CVAA
H05040130-010	ASP10-H16	04/14/05 15:15 04/14/05	Solid	Same As Above

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative or Report.

If you have any questions regarding these tests results, please call.

Report Approved By:



## LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-001  
Client Sample ID: ASP01-B3

Report Date: 05/02/05  
Collection Date: 04/14/05 14:15  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	34.9	mg/kg		5.0		SW6020	04/27/05 00:49 / rth
Arsenic	130	mg/kg		5.0		SW6020	04/27/05 00:49 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 03:48 / jjw
Cadmium	3.1	mg/kg		1.0		SW6010B	04/20/05 19:24 / jjw
Chromium	60.8	mg/kg		5.0		SW6010B	04/20/05 19:24 / jjw
Cobalt	164	mg/kg		5.0		SW6010B	04/20/05 19:24 / jjw
Iron	196000	mg/kg	D	40		SW6010B	04/20/05 19:28 / jjw
Lead	134	mg/kg		5.0		SW6010B	04/20/05 19:28 / jjw
Manganese	11400	mg/kg		5.0		SW6010B	04/22/05 03:48 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 13:51 / KC
Nickel	8.4	mg/kg		5.0		SW6010B	04/20/05 19:24 / jjw
Phosphorus	652	mg/kg		10		SW6010B	04/22/05 03:48 / jjw
Selenium	6.4	mg/kg		5.0		SW6020	04/27/05 00:49 / rth
Zinc	13200	mg/kg		5.0		SW6010B	04/20/05 19:28 / jjw

Report RL - Analyte reporting limit.

MCL - Maximum contaminant level.

Definitions: QCL - Quality control limit.

ND - Not detected at the reporting limit.

D - RL increased due to sample matrix interference.

**LABORATORY ANALYTICAL REPORT**

**Client:** MT DEQ  
**Project:** ASARCO Slag Pile  
**Lab ID:** H05040130-002  
**Client Sample ID:** ASP02-B5

**Report Date:** 05/02/05  
**Collection Date:** 04/14/05 14:21  
**Date Received:** 04/14/05  
**Matrix:** Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	46.7	mg/kg		5.0		SW6020	04/27/05 00:56 / rth
Arsenic	135	mg/kg		5.0		SW6020	04/27/05 00:56 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 03:51 / jjw
Cadmium	4.1	mg/kg		1.0		SW6010B	04/20/05 19:32 / jjw
Chromium	59.4	mg/kg		5.0		SW6010B	04/20/05 19:32 / jjw
Cobalt	207	mg/kg		5.0		SW6010B	04/20/05 19:32 / jjw
Iron	243000	mg/kg	D	80		SW6010B	04/22/05 03:51 / jjw
Lead	140	mg/kg		5.0		SW6010B	04/20/05 19:32 / jjw
Manganese	11700	mg/kg		5.0		SW6010B	04/22/05 03:51 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 13:57 / KC
Nickel	20.4	mg/kg		5.0		SW6020	04/27/05 00:56 / rth
Phosphorus	584	mg/kg		10		SW6010B	04/22/05 03:51 / jjw
Selenium	8.5	mg/kg		5.0		SW6020	04/27/05 00:56 / rth
Zinc	16900	mg/kg		5.0		SW6010B	04/22/05 03:51 / jjw

**Report** RL - Analyte reporting limit.  
**Definitions:** QCL - Quality control limit.  
 D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.  
 ND - Not detected at the reporting limit.

**LABORATORY ANALYTICAL REPORT**

**Client:** MT DEQ  
**Project:** ASARCO Slag Pile  
**Lab ID:** H05040130-003  
**Client Sample ID:** ASP03-B14

**Report Date:** 05/02/05  
**Collection Date:** 04/14/05 14:28  
**Date Received:** 04/14/05  
**Matrix:** Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
PHYSICAL CHARACTERISTICS							
Moisture	0.500	wt%		0.0100		SW3550A	04/22/05 08:15 / MC
CHEMICAL CHARACTERISTICS							
pH, 1:2	8.6	s.u.		0.1		ASA10-3	04/25/05 16:18 / srm
Chloride, 1:2	1.99	mg/kg		1.00		ASA10-3	04/26/05 11:49 / qed
METALS, TOTAL							
Antimony	33.7	mg/kg		5.0		SW6020	04/27/05 01:03 / rth
Arsenic	118	mg/kg		5.0		SW6020	04/27/05 01:03 / rth
Beryllium	ND	mg/kg		5.0		SW6010S	04/22/05 04:02 / jjw
Cadmium	2.6	mg/kg		1.0		SW6010S	04/20/05 19:35 / jjw
Chromium	67.1	mg/kg		5.0		SW6010S	04/20/05 19:35 / jjw
Cobalt	117	mg/kg		5.0		SW6010S	04/20/05 19:35 / jjw
Iron	264000	mg/kg	D	80		SW6010S	04/22/05 04:02 / jjw
Lead	63.8	mg/kg		5.0		SW6010S	04/20/05 19:35 / jjw
Manganese	13200	mg/kg		5.0		SW6010S	04/22/05 04:02 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 13:59 / K.C
Nickel	14.5	mg/kg		5.0		SW6020	04/27/05 01:03 / rth
Phosphorus	612	mg/kg		10		SW6010S	04/22/05 04:02 / jjw
Selenium	8.4	mg/kg		5.0		SW6020	04/27/05 01:03 / rth
Zinc	13500	mg/kg		5.0		SW6010S	04/22/05 04:02 / jjw
VOLATILE ORGANIC COMPOUNDS							
Bromoform	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Benzene	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Bromobenzene	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Bromochloromethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Bromodichloromethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Bromomethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Carbon tetrachloride	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Chlorobenzene	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Chloroethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
2-Chloroethyl vinyl ether	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Chloroform	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Chloromethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
2-Chlorotoluene	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
4-Chlorotoluene	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Chlorodibromomethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
1,2-Dibromoethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Dibromomethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
1,2-Dichlorobenzene	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr

**Report** RL - Analyte reporting limit.

**Definitions:** QCL - Quality control limit.

D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.

# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-003  
Client Sample ID: ASP03-B14

Report Date: 05/02/05  
Collection Date: 04/14/05 14:28  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
VOLATILE ORGANIC COMPOUNDS							
1,3-Dichlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,4-Dichlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Dichlorodifluoromethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1-Dichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,2-Dichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
cis-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
trans-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,2-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,3-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
2,2-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
cis-1,3-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
trans-1,3-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Ethylbenzene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Methyl tert-butyl ether (MTBE)	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Methylene chloride	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Methyl ethyl ketone	ND	mg/kg		4.0		SW8260B	04/21/05 16:42 / trr
Styrene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1,1,2-Tetrachloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1,2,2-Tetrachloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Tetrachloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Toluene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1,1-Trichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1,2-Trichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Trichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Trichlorofluoromethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,2,3-Trichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Vinyl chloride	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
m+p-Xylenes	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
o-Xylene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Surr: p-Bromofluorobenzene	134	%REC			78-160	SW8260B	04/21/05 16:42 / trr
Surr: Dibromofluoromethane	116	%REC			70-132	SW8260B	04/21/05 16:42 / trr
Surr: 1,2-Dichloroethane-d4	114	%REC			60-136	SW8260B	04/21/05 16:42 / trr
Surr: Toluene-d8	120	%REC			75-138	SW8260B	04/21/05 16:42 / trr
SEMI-VOLATILE ORGANIC COMPOUNDS							
Acenaphthene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Acenaphthylene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Benzo(a)anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm

Report RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

**LABORATORY ANALYTICAL REPORT**

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-003  
Client Sample ID: ASP03-B14

Report Date: 05/02/05  
Collection Date: 04/14/05 14:28  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
SEMI-VOLATILE ORGANIC COMPOUNDS							
Benzo(a)pyrene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Benzo(b)fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Benzo(g,h,i)perylene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Benzo(k)fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Chrysene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Dibenzo(a,h)anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Fluorene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Indeno(1,2,3-cd)pyrene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Naphthalene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Phenanthrene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Pyrene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Surr: 2-Fluorobiphenyl	82.5	%REC			30-115	SW8270C	04/21/05 13:56 / sm
Surr: Nitrobenzene-d5	83.7	%REC			23-120	SW8270C	04/21/05 13:56 / sm
Surr: Terphenyl-d14	95.6	%REC			18-137	SW8270C	04/21/05 13:56 / sm
POLYCHLORINATED BIPHENYLS (PCB'S)							
Aroclor 1016	ND	mg/kg		0.017		SW8022	04/24/05 03:13 / law
Aroclor 1221	ND	mg/kg		0.017		SW8022	04/24/05 03:13 / law
Aroclor 1232	ND	mg/kg		0.017		SW8022	04/24/05 03:13 / law
Aroclor 1242	ND	mg/kg		0.017		SW8022	04/24/05 03:13 / law
Aroclor 1248	ND	mg/kg		0.017		SW8022	04/24/05 03:13 / law
Aroclor 1254	ND	mg/kg		0.017		SW8022	04/24/05 03:13 / law
Aroclor 1260	ND	mg/kg		0.017		SW8022	04/24/05 03:13 / law
Aroclor 1262	ND	mg/kg		0.017		SW8022	04/24/05 03:13 / law
Aroclor 1268	ND	mg/kg		0.017		SW8022	04/24/05 03:13 / law
Surr: Decachlorobiphenyl	96.0	%REC			50-126	SW8022	04/24/05 03:13 / law
Surr: Tetrachloro-m-xylene	86.0	%REC			42-115	SW8022	04/24/05 03:13 / law
Sample extract received a Sulfuric Acid Clean-up (EPA Method 3665) and a Sulfur Clean-up (EPA Method 3650) prior to analysis							

Sample extract received a Sulfuric Acid Clean-up (EPA Method 3665) and a Sulfur Clean-up (EPA Method 3650) prior to analysis.

Report RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-004  
Client Sample ID: ASP04-C4

Report Date: 05/02/05  
Collection Date: 04/14/05 14:37  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	43.5	mg/kg		5.0		SW6020	04/27/05 01:10 / rth
Arsenic	155	mg/kg		5.0		SW6020	04/27/05 01:10 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:06 / jjw
Cadmium	5.1	mg/kg		1.0		SW6010B	04/20/05 19:39 / jjw
Chromium	71.2	mg/kg		5.0		SW6010B	04/20/05 19:39 / jjw
Cobalt	212	mg/kg		5.0		SW6010B	04/20/05 19:39 / jjw
Iron	273000	mg/kg	D	80		SW6010B	04/22/05 04:06 / jjw
Lead	364	mg/kg		5.0		SW6010B	04/20/05 19:39 / jjw
Manganese	12200	mg/kg		5.0		SW6010B	04/22/05 04:06 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:01 / KC
Nickel	22.9	mg/kg		5.0		SW6020	04/27/05 01:10 / rth
Phosphorus	586	mg/kg		10		SW6010B	04/22/05 04:06 / jjw
Selenium	12.1	mg/kg		5.0		SW6020	04/27/05 01:10 / rth
Zinc	17900	mg/kg		5.0		SW6010B	04/22/05 04:06 / jjw

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



**LABORATORY ANALYTICAL REPORT**

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-005  
Client Sample ID: ASP05-C9

Report Date: 05/02/05  
Collection Date: 04/14/05 14:44  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
PHYSICAL CHARACTERISTICS							
Moisture	0.800	wt%		0.0100		SW3550A	04/22/05 08:15 / MC
CHEMICAL CHARACTERISTICS							
pH, 1:2	9.0	s.u.		0.1		ASA10-3	04/25/05 16:18 / srm
Chloride, 1:2	2.89	mg/kg		1.00		ASA10-3	04/26/05 12:13 / qed
METALS, TOTAL							
Antimony	37.1	mg/kg		5.0		SW6020	04/27/05 01:44 / rth
Arsenic	117	mg/kg		5.0		SW6020	04/27/05 01:44 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:13 / jjw
Cadmium	3.1	mg/kg		1.0		SW6010B	04/20/05 19:42 / jjw
Chromium	74.4	mg/kg		5.0		SW6010B	04/20/05 19:42 / jjw
Cobalt	153	mg/kg		5.0		SW6010B	04/20/05 19:42 / jjw
Iron	252000	mg/kg	D	80		SW5010S	04/22/05 04:13 / jjw
Lead	160	mg/kg		5.0		SW6010S	04/20/05 19:42 / jjw
Manganese	11800	mg/kg		5.0		SW6010S	04/22/05 04:13 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:04 / KC
Nickel	15.9	mg/kg		5.0		SW6020	04/27/05 01:44 / rth
Phosphorus	707	mg/kg		10		SW6010S	04/22/05 04:13 / jjw
Selenium	12.7	mg/kg		5.0		SW6020	04/27/05 01:44 / rth
Zinc	18500	mg/kg		5.0		SW6010B	04/22/05 04:13 / jjw
VOLATILE ORGANIC COMPOUNDS							
Bromoform	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
Benzene	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
Bromobenzene	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
Bromochloromethane	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
Bromodichloromethane	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
Bromomethane	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
Carbon tetrachloride	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
Chlorobenzene	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
Chloroethane	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
2-Chloroethyl vinyl ether	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
Chloroform	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
Chloromethane	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
2-Chlorotoluene	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
4-Chlorotoluene	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
Chlorodibromomethane	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
1,2-Dibromoethane	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
Dibromomethane	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr
1,2-Dichlorobenzene	ND	mg/kg		0.20		SW8260S	04/21/05 17:16 / trr

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.

# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-005  
Client Sample ID: ASP05-C9

Report Date: 05/02/05  
Collection Date: 04/14/05 14:44  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
VOLATILE ORGANIC COMPOUNDS							
1,3-Dichlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,4-Dichlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Dichlorodifluoromethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,1-Dichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,2-Dichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
cis-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,1-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
trans-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,2-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,3-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
2,2-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,1-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
cis-1,3-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
trans-1,3-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Ethylbenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Methyl tert-butyl ether (MTBE)	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Methylene chloride	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Methyl ethyl ketone	ND	mg/kg		4.0		SW8260B	04/21/05 17:16 / trr
Styrene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,1,1,2-Tetrachloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:15 / trr
1,1,2,2-Tetrachloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Tetrachloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Toluene	ND	mg/kg		0.20		SW8260B	04/21/05 17:15 / trr
1,1,1-Trichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,1,2-Trichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Trichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:15 / trr
Trichlorofluoromethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,2,3-Trichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Vinyl chloride	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
m+p-Xylenes	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
o-Xylene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Surr: p-Bromofluorobenzene	118	%REC			78-160	SW8260B	04/21/05 17:16 / trr
Surr: Dibromofluoromethane	104	%REC			70-132	SW8260B	04/21/05 17:16 / trr
Surr: 1,2-Dichloroethane-d4	104	%REC			60-136	SW8260B	04/21/05 17:15 / trr
Surr: Toluene-d8	104	%REC			75-138	SW8260B	04/21/05 17:16 / trr
SEMI-VOLATILE ORGANIC COMPOUNDS							
Acenaphthene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Acenaphthylene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Benzo[ <i>a</i> ]anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm

Report: RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-005  
Client Sample ID: ASP05-C9

Report Date: 05/02/05  
Collection Date: 04/14/05 14:44  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
SEMI-VOLATILE ORGANIC COMPOUNDS							
Benzo(a)pyrene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Benzo(b)fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Benzo(g,h,i)perylene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Benzo(k)fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Chrysene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Dibenzo(a,h)anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Fluorene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Indeno(1,2,3-cd)pyrene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Naphthalene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Phenanthrene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Pyrene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Surr: 2-Fluorobiphenyl	88.6	%REC			30-115	SW8270C	04/21/05 14:39 / sm
Surr: Nitrobenzene-d5	86.9	%REC			23-120	SW8270C	04/21/05 14:39 / sm
Surr: Terphenyl-d14	98.9	%REC			16-137	SW8270C	04/21/05 14:39 / sm
POLYCHLORINATED BIPHENYLS (PCB'S)							
Aroclor 1016	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1221	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1232	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1242	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1248	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1254	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1260	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1262	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1268	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Surr: Decachlorobiphenyl	140	%REC	S		50-126	SW8082	04/24/05 03:40 / law
Surr: Tetrachloro-m-xylene	108	%REC			42-115	SW8082	04/24/05 03:40 / law

Sample extract received a Sulfuric Acid Clean-up (EPA Method 3665) and a Sulfur Clean-up (EPA Method 3660) prior to analysis.

Report RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.  
S - Spike recovery outside of advisory limits.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-006  
Client Sample ID: ASP06-D16

Report Date: 05/02/05  
Collection Date: 04/14/05 14:50  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	42.5	mg/kg		5.0		SW6020	04/27/05 01:51 / rth
Arsenic	130	mg/kg		5.0		SW6020	04/27/05 01:51 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:17 / jjw
Cadmium	2.2	mg/kg		1.0		SW6010B	04/20/05 19:46 / jjw
Chromium	68.4	mg/kg		5.0		SW6010B	04/20/05 19:46 / jjw
Cobalt	173	mg/kg		5.0		SW6010B	04/20/05 19:46 / jjw
Iron	305000	mg/kg	D	80		SW6010B	04/22/05 04:17 / jjw
Lead	55.5	mg/kg		5.0		SW6010B	04/20/05 19:46 / jjw
Manganese	11800	mg/kg		5.0		SW6010B	04/22/05 04:17 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:06 / KC
Nickel	18.8	mg/kg		5.0		SW6020	04/27/05 01:51 / rth
Phosphorus	647	mg/kg		10		SW6010B	04/22/05 04:17 / jjw
Selenium	11.0	mg/kg		5.0		SW6020	04/27/05 01:51 / rth
Zinc	19100	mg/kg		5.0		SW6010B	04/22/05 04:17 / jjw

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-007  
Client Sample ID: ASP07-F3

Report Date: 05/02/05  
Collection Date: 04/14/05 14:57  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	42.7	mg/kg		5.0		SW6020	04/27/05 01:58 / rth
Arsenic	102	mg/kg		5.0		SW6020	04/27/05 01:58 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:20 / jjw
Cadmium	1.9	mg/kg		1.0		SW6010B	04/20/05 19:49 / jjw
Chromium	70.5	mg/kg		5.0		SW6010B	04/20/05 19:49 / jjw
Cobalt	171	mg/kg		5.0		SW6010B	04/20/05 19:49 / jjw
Iron	286000	mg/kg	D	80		SW6010B	04/22/05 04:20 / jjw
Lead	45.3	mg/kg		5.0		SW6010B	04/20/05 19:49 / jjw
Manganese	12100	mg/kg		5.0		SW6010B	04/22/05 04:20 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:10 / KC
Nickel	17.4	mg/kg		5.0		SW6020	04/27/05 01:58 / rth
Phosphorus	578	mg/kg		10		SW6010B	04/22/05 04:20 / jjw
Selenium	13.8	mg/kg		5.0		SW6020	04/27/05 01:58 / rth
Zinc	19100	mg/kg		5.0		SW6010B	04/22/05 04:20 / jjw

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



### LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-008  
Client Sample ID: ASP08-G2

Report Date: 05/02/05  
Collection Date: 04/14/05 15:04  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
PHYSICAL CHARACTERISTICS							
Moisture	0.800	wt%		0.0100		SW3550A	04/22/05 08:15 / MC
CHEMICAL CHARACTERISTICS							
pH, 1:2	9.2	s.u.		0.1		ASA10-3	04/25/05 16:18 / sm
Chloride, 1:2	1.06	mg/kg		1.00		ASA10-3	04/26/05 12:48 / qed
METALS, TOTAL							
Antimony	43.8	mg/kg		5.0		SW6020	04/27/05 02:05 / rth
Arsenic	119	mg/kg		5.0		SW6020	04/27/05 02:05 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:24 / jjw
Cadmium	2.5	mg/kg		1.0		SW6010B	04/20/05 20:00 / jjw
Chromium	59.8	mg/kg		5.0		SW6010B	04/20/05 20:00 / jjw
Cobalt	194	mg/kg		5.0		SW6010B	04/20/05 20:00 / jjw
Iron	290000	mg/kg	D	80		SW6010B	04/22/05 04:24 / jjw
Lead	116	mg/kg		5.0		SW6010B	04/20/05 20:00 / jjw
Manganese	13100	mg/kg		5.0		SW6010B	04/22/05 04:24 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:12 / KC
Nickel	17.9	mg/kg		5.0		SW6020	04/27/05 02:05 / rth
Phosphorus	720	mg/kg		10		SW6010B	04/22/05 04:24 / jjw
Selenium	9.9	mg/kg		5.0		SW6020	04/27/05 02:05 / rth
Zinc	21100	mg/kg		5.0		SW6010B	04/22/05 04:24 / jjw
VOLATILE ORGANIC COMPOUNDS							
Bromoform	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Benzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Bromobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Bromochloromethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Bromodichloromethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Bromomethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Carbon tetrachloride	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Chlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Chloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
2-Chloroethyl vinyl ether	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Chloroform	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Chloromethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
2-Chlorotoluene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
4-Chlorotoluene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Chlorodibromomethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,2-Dibromoethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Dibromomethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,2-Dichlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr

Report RL - Analyte reporting limit.

MCL - Maximum contaminant level.

Definitions: QCL - Quality control limit.

ND - Not detected at the reporting limit.

D - RL increased due to sample matrix interference.



# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-008  
Client Sample ID: ASP08-G2

Report Date: 05/02/05  
Collection Date: 04/14/05 15:04  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
VOLATILE ORGANIC COMPOUNDS							
1,3-Dichlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,4-Dichlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Dichlorodifluoromethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,1-Dichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,2-Dichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
cis-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,1-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
trans-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,2-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,3-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
2,2-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,1-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
cis-1,3-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
trans-1,3-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Ethylbenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Methyl tert-butyl ether (MTBE)	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Methylene chloride	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Methyl ethyl ketone	ND	mg/kg		4.0		SW8260B	04/21/05 17:51 / trr
Styrene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,1,1,2-Tetrachloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,1,1,2,2-Tetrachloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,1,2,2-Tetrachloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Toluene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,1,1-Trichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,1,2-Trichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Trichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Trichlorofluoromethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,2,3-Trichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Vinyl chloride	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
m+p-Xylenes	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
o-Xylene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Surr: p-Bromofluorobenzene	112	%REC			78-160	SW8260B	04/21/05 17:51 / trr
Surr: Dibromofluoromethane	103	%REC			70-132	SW8260B	04/21/05 17:51 / trr
Surr: 1,2-Dichloroethane-d4	102	%REC			60-136	SW8260B	04/21/05 17:51 / trr
Surr: Toluene-d8	102	%REC			75-138	SW8260B	04/21/05 17:51 / trr
SEMI-VOLATILE ORGANIC COMPOUNDS							
Acenaphthene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Acenaphthylene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Benzo(a)anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm

Report RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

**LABORATORY ANALYTICAL REPORT**

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-008  
Client Sample ID: ASP08-G2

Report Date: 05/02/05  
Collection Date: 04/14/05 15:04  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
SEMI-VOLATILE ORGANIC COMPOUNDS							
Benzo(a)pyrene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Benzo(b)fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Benzo(g,h,i)perylene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Benzo(k)fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Chrysene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Dibenzo(a,h)anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Fluorene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Indeno(1,2,3-cd)pyrene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Naphthalene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Phenanthrene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Pyrene	ND	mg/kg		0.33		SW8270C	04/21/05 15:21 / sm
Surr: 2-Fluorobiphenyl	75.9	%REC			30-115	SW8270C	04/21/05 15:21 / sm
Surr: Nitrobenzene-d5	76.0	%REC			23-120	SW8270C	04/21/05 15:21 / sm
Surr: Terphenyl-d14	88.9	%REC			18-137	SW8270C	04/21/05 15:21 / sm
POLYCHLORINATED BIPHENYLS (PCB'S)							
Aroclor 1016	ND	mg/kg		0.017		SW8082	04/24/05 04:08 / law
Aroclor 1221	ND	mg/kg		0.017		SW8082	04/24/05 04:08 / law
Aroclor 1232	ND	mg/kg		0.017		SW8082	04/24/05 04:08 / law
Aroclor 1242	ND	mg/kg		0.017		SW8082	04/24/05 04:08 / law
Aroclor 1248	ND	mg/kg		0.017		SW8082	04/24/05 04:08 / law
Aroclor 1254	ND	mg/kg		0.017		SW8082	04/24/05 04:08 / law
Aroclor 1260	ND	mg/kg		0.017		SW8082	04/24/05 04:08 / law
Aroclor 1262	ND	mg/kg		0.017		SW8082	04/24/05 04:08 / law
Aroclor 1268	ND	mg/kg		0.017		SW8082	04/24/05 04:08 / law
Surr: Decachlorobiphenyl	125	%REC			50-126	SW8082	04/24/05 04:08 / law
Surr: Tetrachloro-m-xylene	90.0	%REC			42-115	SW8082	04/24/05 04:08 / law

Sample extract received a Sulfuric Acid Clean-up (EPA Method 3655) and a Sulfur Clean-up (EPA Method 3650) prior to analysis.

Report RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-009  
Client Sample ID: ASP09-G4

Report Date: 05/02/05  
Collection Date: 04/14/05 15:07  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	57.6	mg/kg		5.0		SW6020	04/27/05 02:12 / rth
Arsenic	109	mg/kg		5.0		SW6020	04/27/05 02:12 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:27 / jjw
Cadmium	1.4	mg/kg		1.0		SW6010B	04/20/05 20:04 / jjw
Chromium	90.0	mg/kg		5.0		SW6010B	04/20/05 20:04 / jjw
Cobalt	204	mg/kg		5.0		SW6010B	04/20/05 20:04 / jjw
Iron	294000	mg/kg	D	80		SW6010B	04/22/05 04:27 / jjw
Lead	64.0	mg/kg		5.0		SW6010B	04/20/05 20:04 / jjw
Manganese	11900	mg/kg		5.0		SW6010B	04/22/05 04:27 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:14 / KC
Nickel	20.6	mg/kg		5.0		SW6020	04/27/05 02:12 / rth
Phosphorus	552	mg/kg		10		SW6010B	04/22/05 04:27 / jjw
Selenium	12.2	mg/kg		5.0		SW6020	04/27/05 02:12 / rth
Zinc	20100	mg/kg		5.0		SW6010B	04/22/05 04:27 / jjw

Report RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.  
D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



## LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-010  
Client Sample ID: ASP10-H16

Report Date: 05/02/05  
Collection Date: 04/14/05 15:15  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	34.1	mg/kg		5.0		SW6020	04/22/05 05:23 / rlh
Arsenic	117	mg/kg		5.0		SW6020	04/22/05 05:23 / rlh
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:31 / jjw
Cadmium	2.1	mg/kg		1.0		SW6010B	04/20/05 20:07 / jjw
Chromium	59.0	mg/kg		5.0		SW6010B	04/20/05 20:07 / jjw
Cobalt	137	mg/kg		5.0		SW6010B	04/20/05 20:07 / jjw
Iron	305000	mg/kg	D	80		SW6010B	04/22/05 04:31 / jjw
Lead	103	mg/kg		5.0		SW6010B	04/20/05 20:07 / jjw
Manganese	10400	mg/kg		5.0		SW6010B	04/22/05 04:31 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:16 / KC
Nickel	14.7	mg/kg		5.0		SW6020	04/22/05 05:23 / rlh
Phosphorus	710	mg/kg		10		SW6010B	04/22/05 04:31 / jjw
Selenium	9.1	mg/kg		5.0		SW6020	04/22/05 05:23 / rlh
Zinc	22200	mg/kg		5.0		SW6010B	04/22/05 04:31 / jjw

Report RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.  
D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

## **APPENDIX 4-1-2**

### **SUMMARY OF SLAG TESTING ANALYSES INCLUDING TEST BASIN WATER QUALITY, SLAG BOTTLE ROLL TESTS AND EP TOXICITY TESTS**

1 OF 200 WATER QUALITY ANALYSES - ASARCO EAST HELENA

SITE NAME	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG
SAMPLE DATE	12/30/86	04/02/87	04/22/87	04/22/87	05/22/87	05/22/87	05/22/87	05/22/87	07/15/87	07/15/87
LAP	ASARCO	ASARCO	ASARCO	CHMTC	ASARCO	ASARCO	CHMTC	CHMTC	ASARCO	ASARCO
REMARKS	BOTTLE			SPLIT	REPLICATE		SPLIT	REPLICATE	REPLICATE	
SAMPLE NUMBER		8704-1	8704-20		8705-50	8705-47			8707-02	8707-01
<b>PHYSICAL PARAMETERS</b>										
WATER TEMPERATURE (C)			7.5			9.7				
SPEC. COND. (UMHOS/CM) FIELD			2235		2268	2265			2137	2150
SPEC. COND. (UMHOS/CM) LAB	115	1950	2250			2320				2400
PH FIELD			6.16 *		7.48	7.69				7.46
PH LAB	9.9	7.77	6.81 *			7.52				7.55
TDS MEAS. @ 180 DEG. C	94	1842	1903 *	993		2086	2227			1912 *
OXYGEN (O) DISS			4.3			4.3				4.1
DEPTH TO SWL BELOW MP (FT)			8.74 *			8.01				
<b>COMMON IONS</b>										
CALCIUM (CA)	12	510	454	449.0		422	417.0	412.0		321
MAGNESIUM (MG)	0.49	20	25.5	27.40		20.2	25.10	24.90		22.9
SODIUM (NA)	5.1	76	71.5	76.6		85	72.5	71.8		74
POTASSIUM (K)	3.9	54	65	60.80		74	136.00	122.00		68
BICARBONATE (HCO3) (LAB)	11.0	260 *	102			98				84
CARBONATE AS CO3 (LAB)	19	11	11			11				11.0
SULFATE (SO4)	10	1450	1425	1240.0		1338	1304.0			1200
CHLORIDE (CL)	18	6.0	7.0	10.0		7.0	30.0			4.0
<b>TRACE ELEMENTS</b>										
ARSENIC (AS) DISS	0.19	0.0325	0.0283	0.0198	0.038	0.030	0.0530	0.0320	0.057 *	0.039 *
ARSENIC (AS) +3			0.014						0.0216	0.040 *
ARSENIC (AS) +5			0.010						0.0722 *	0.0268
CADMIUM (CD) DISS	0.003	0.075	0.040	0.0720	0.051	0.051	0.0520	0.0500	0.055	0.049
COFFER (CU) DISS	0.008	0.280 *	0.193	0.2260	0.125	0.128	0.1480	0.1340	0.118	0.110
IRON (FE) DISS	0.11	10.020	10.020	10.100	0.044	0.045	10.100	10.100	10.020	10.020
IRON (FE II)			0.010 *						0.060	0.080
LEAD (PB) DISS	0.017	0.045 *	0.030 *	0.0334	0.019	0.020	0.0323	0.0432	0.016	0.021
MANGANESE (MN) DISS	0.017	1.080	1.440	2.640	1.910	1.930	2.660	2.640	2.930	2.890
ZINC (ZN) DISS	0.023	3.580	3.700	4.450	2.830	2.890	2.860	2.820	2.500	2.300

All quantities in milligrams per liter unless otherwise noted. Blank line indicates parameter not tested.

Output Date: 03-19-1989  
HWQ-6/86-R1

SLAG WATER QUALITY ANALYSES - ASARCO EAST HELENA

SITE NAME	FUMED SLAG	FUMED SLAG	UNFUMED SLAG	UNFUMED SLAG	UNFUMED SLAG	UNFUMED SLAG	UNFUMED SLAG	UNFUMED SLAG	UNFUMED SLAG
SAMPLE DATE	02/22/87	02/22/87	12/30/86	04/22/87	04/22/87	05/22/87	05/22/87	07/15/87	09/22/87
LAB	ASARCO	ASARCO	ASARCO	ASARCO	CHMTC	CHMTC	ASARCO	ASARCO	ASARCO
REMARKS	REPLICATE		BOTTLE		SPLIT	SPLIT			
SAMPLE NUMBER	8709-06	8709-04		8704-24			8705-48	8707-03	8709-07
PHYSICAL PARAMETERS									
WATER TEMPERATURE (C)		16 *		10.5			10.9		17 *
SPEC. COND. (UMHOS/CM) FIELD	1368	1366		16296 *			19978	19850	
SPEC. COND. (UMHOS/CM) LAB		1350	200	16500			20200	22000	12200
FH FIELD				9.49			9.97 *	9.48	
FH LAB		7.63	10.4	9.25			9.6	9.73	9.69
TDS MEAS. @ 160 DEG. C		1114	206	14183 *	7298	18720	18523	18172 *	10984
OXYGEN (O) DISS		4.0		4.5			3.2	3.0	4.1
DEPTH TO SWL BELOW MP (FT)		7.74		8.83			7.85		7.02
COMMON IONS									
CALCIUM (CA)		126.5	17	371	437.0		361	426	345
MAGNESIUM (MG)		11	0.22	8.5	8.76		6.7	6.4	4.2
SODIUM (NA)		45	19	2900	2960.0		3890	3800	2200
POTASSIUM (K)		45	22	1950	158.00		2650	2550	1540
ALKALINITY AS CaCO3 (LAK)							587		
BICARBONATE (HCO3) (LAK)		72	11.0	486 *			11	11.0	11.0
CARBONATE AS CO3 (LAK)		11.0	36	11			284	163	197
HYDROXIDE (OH)							38	46	30
SULFATE (SO4)		480 *	16	9200	2480.0	2463.0	1200	11750	6750
CHLORIDE (CL)		3.0	16	57	63.0	75.0	66	74	35
TRACE ELEMENTS									
ARSENIC (AS) DISS	0.075 *	0.054 *	0.31	0.620	0.5130		0.353	0.590 *	0.553
ARSENIC (AS) +3				0.400				0.550	
ARSENIC (AS) +5				0.030				0.054	
CADMIUM (CD) DISS	0.021	0.021	0.003	0.030 *	0.0063		0.003	0.005	0.003
COFFER (CU) DISS	0.055	0.055	0.008	0.130	0.1190		0.126	0.085	0.043
IRON (FE) DISS	10.020	10.020	0.070	0.150	0.100		0.225 *	10.020	10.020
IRON (FE II)	0.02	0.01		10.010				0.070	10.01
LEAD (PB) DISS	0.023	0.026	0.083	0.098 *	0.1430		0.0505	0.021 *	0.094
MANGANESE (MN) DISS	1.590	1.540	10.017	0.155 *	0.129		0.083	0.090	0.050
ZINC (ZN) DISS	0.813	0.788 *	0.053	0.100 *	0.090		0.048	0.030	0.023

All quantities in milligrams per liter unless otherwise noted. Blank line indicates parameter not tested.

Output Date: 03-19-1989  
HWQ-6/86-F1

TABLE 1  
East Helena

SLAG SAMPLE LEACHATE ANALYSIS

1979

979

SARCO

ab No.

Description

(PPM in Leachate)

		As	Ba	Cd	Cr	Pb	Hg	Sa	Ag	(Zn)
3278	Slag 1 (2)	.018	.3	.08	<.01	.6	<.001	<.005	<.01	3.5
3279	Slag 2 (2)	<.014	.1	.13	<.01	<.1	<.001	<.005	<.01	2.6
3280	Slag 3 (2)	.020	.1	.03	<.01	3.4	<.001	<.005	<.01	2.1
3281	Slag 4 (2)	<.014	.2	<.01	<.01	<.1	<.001	<.005	<.01	1.0
3282	Slag 5 (Pb)	.032	.2	<.01	<.01	3.3	<.001	<.005	<.01	5.0
3283	Slag 6 (Pb)	<.014	.1	.15	<.01	1.0	<.001	<.005	<.01	6.0

Maximum Contaminant  
Levels for Non-  
toxic Leachates

(0.5)

10.0 0.1 0.5 0.5 .02 0.1 0.5 ---\*

NOTE



Currently unspecified but estimated to be 50 ppm (10 times the Drinking Water Standard).

Ks

ASARCO Incorporated  
Department of Environmental Sciences  
EAST HELENA  
Miscellaneous Sample Results

ASARCO LAB #	SAMPLE DESCRIPTION	1985 SAMPLE DATE	As ppm	Cd ppm	Pb ppm
3658 Air Cooled	Blast Furnace Slag	5/ 7	.12	.002	5.3
3659 Granulated	Blast Furnace Slag	5/ 7	.047	<.002	.050

ASARCO Incorporated  
Department of Environmental Sciences  
EAST HELENA  
Miscellaneous Sample Results

ASARCO LAB #	SAMPLE DESCRIPTION	1985 SAMPLE DATE	Ag ppm	As ppm	Ba ppm	Cd ppm	Cr ppm
7860	TCLP-Fumed Blast Furnace Slag	10/21	<.002	.45	4.6	.007	.01
7861	TCLP-Unfumed Blast Furnace Slag	10/21	<.002	1.2	1.6	.25	.01

ASARCO LAB #	SAMPLE DESCRIPTION	1985 SAMPLE DATE	Hg ppb	Pb ppm	Se ppm
7860	TCLP-Fumed Blast Furnace Slag	10/21	<.005	.28	.004
7861	TCLP-Unfumed Blast Furnace Slag	10/21	<.001	10.	.010



ASARCO Incorporated  
Department of Environmental Sciences  
EAST HELENA  
Miscellaneous Sample Results

ASARCO LAB #	SAMPLE DESCRIPTION	1985 SAMPLE DATE	Ag ppm	As ppm	Ba ppm	Cd ppm	Cr ppm
6378	Air Cooled Slag	8/15	<.005	.012	<1.0	.002	<.17
6379	Granulated Slag	8/15	<.005	.010	<1.0	<.002	<.17

ASARCO LAB #	SAMPLE DESCRIPTION	1985 SAMPLE DATE	Hg ppb	Pb ppm	Se ppm	pH
6378	Air Cooled Slag	8/15	<.50	1.1	<.080	9.2
6379	Granulated Slag	8/15	<.50	.050	<.080	8.0

ASARCO Incorporated  
Department of Environmental Sciences  
EAST HELENA  
Miscellaneous Sample Results

ASARCO LAB #	SAMPLE DESCRIPTION	1983 SAMPLE DATE	Pb ppm	Cd ppm	Cr ppm	Ag ppm	Ba ppm
11370	2-4 mo. old Slag Composite	11/28	9.8	3.9	<.030	<.008	7.2
11371	1 week old Slag Composite	11/28	3.9	<.004	<.030	<.008	8.7

ASARCO LAB #	SAMPLE DESCRIPTION	1983 SAMPLE DATE	As ppm	Se ppm	Hg ppb	pH
11370	2-4 mo. old Slag Composite	11/28	.20	.012	<.50	10.
11371	1 week old Slag Composite	11/28	.35	<.004	<.50	10.

	<u>Ba</u>	<u>Pb</u>	<u>Cd</u>	<u>Cr</u>	<u>Ag</u>	<u>Se</u>	<u>Hg</u>	<u>As</u>
Maximum allowable levels of contaminants in the leachate of a non-toxic material.....	100.	5.0	1.0	5.0	5.0	1.0	.2	5.0

storage area. The sediments are being stored in a protected environment to prevent contamination of the adjacent area from dispersion of the sediments by wind and water. The sediments are located on a concrete pad to prevent contact with adjacent soils. A containment berm around the perimeter of the sediment pile diverts run-on. A geomembrane cover over the sediments prevents wind and water dispersion and eliminates subsequent generation of leachate.

Approximately 31,000 cubic yards of dewatered sediments were transported to the Lower Ore Storage Area. Four thousand cubic yards of these sediments were smelted prior to the stockpile being covered with a geomembrane liner in October 1997. The sediments will remain in this interim storage facility while EPA considers Asarco's request to modify the sediment smelting requirement of the ROD, and instead dispose of these materials in the on-site CAMU.

#### **4.1.4 Slag**

The effect of the slag pile on groundwater and surface water was evaluated as part of the 1990 Comprehensive RI/FS. The evaluation was conducted in accordance with procedures presented in the Comprehensive RI/FS Work Plan (Hydrometrics 1987). Based on the results of the evaluation, the RI/FS concluded that the potential for impacts to groundwater and surface water from slag is low and the subsequent ROD did not specify any remedial action for the Slag Pile Operable Unit. Post-RI/FS monitoring at adjacent surface water and groundwater monitoring sites is on-going. A summary of the slag investigation and the findings of the RI relative to slag are presented below.

##### **4.1.4.1 Investigation of Potential Groundwater Impacts**

##### **Slag Infiltration Test Basin Construction, Water Level Measurement, Water Quality Sampling and Analysis**

Infiltration and percolation of precipitation into the slag pile were directly measured in slag test basins constructed in fumed and unfumed slag. Fumed slag is a by-product of the zinc

recovery process, which consisted of air injection into molten slag to recover zinc oxide. Unfumed slag is a by-product of the blast furnace which has not been further processed through the zinc recovery process. The zinc recovery process was suspended in 1982 and zinc is no longer recovered from the slag. Since 1982, unfumed slag has been placed in an area segregated from fumed slag.

Two slag infiltration catchment basins were constructed; one in a typical location in the fumed slag, and one in a typical location in unfumed slag. Construction of the test basins included removal of a 2 to 3 meter layer of slag, placement of an impervious 36-mil reinforced Hypalon liner in the excavation, installation of a collection sump, and replacement of the slag. Figure 4-1-8 shows the slag test basin design.

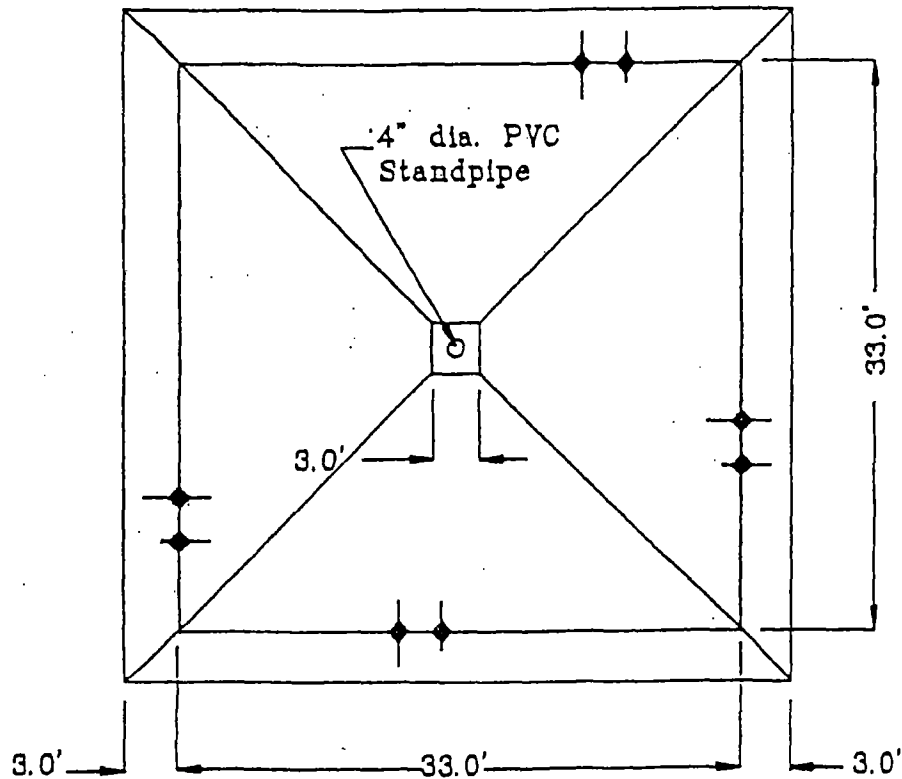
Water elevations in the collection sumps were measured periodically, and after rainfall or snowmelt events to determine the actual accumulation of water in the slag basins. Collected water was pumped from the sump, sent to the TSC laboratory, and tested for the parameters listed in Table 3-2-2. Analytical results of water collected in the test basins are summarized in Appendix 4-1-2.

### **Slag Material Sampling and Analysis**

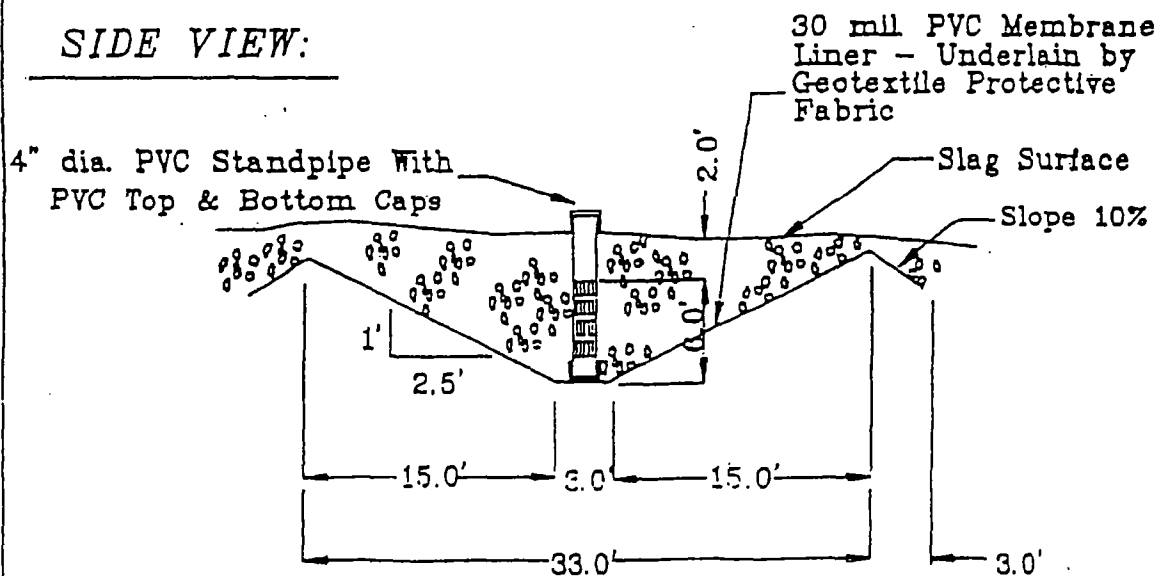
To supplement slag information collected from the test basins, samples of slag were collected from the test basin sites and sent to the TSC lab for "bottle roll" tests. Estimates of slag leachability were obtained by conducting "bottle roll" test on slag samples. Bottle roll tests involved placing samples of slag in bottles in the laboratory, adding deionized water, agitating the bottles for approximately 24 hours, then analyzing the water for concentrations of arsenic and metals. Details of the bottle roll extraction tests are in the Quality Assurance Project Plan (QAPP) Addendum to the Phase II Water Resources Investigation Work Plan (Hydrometrics, 1986). Bottle roll test results are in Appendix 4-1-2.

FIGURE 4-1-8 SLAG TEST BASIN DESIGN

PLAN VIEW:



SIDE VIEW:



NOTE: PVC Standpipe is schedule 40, capped on both ends and perforated with saw-cut slots from 2.0' to 8.0' beneath the slag surface.

In addition to the slag sampling and bottle roll test performed as part of the East Helena RI activities, additional slag samples were collected and analyzed using the EP toxicity procedure. Results of these analyses are also in Appendix 4-1-2.

### **Assessment of Groundwater Impacts**

In an effort to estimate infiltration rates, the volume of water retained in the slag test basins was calculated for 13 time intervals, beginning December 23, 1986 and ending February 10, 1988. These volumes were compared to the volumes of precipitation during the same periods and converted to percentages, as summarized in Table 4-1-10. The percentage of precipitation retained in the basins varied from -6.7% to 61.9% in the fumed slag, and -45% to 61.8% in the unfumed slag (negative percentages indicate evaporation rates exceed precipitation collected in the test basins). Although there is a relationship of test basin water level fluctuations to precipitation (see Figures 4-1-9 and 4-1-10), the relationship may be complicated by variable evaporation, hence, infiltration rates are variable.

Concentrations of arsenic and metals from test basin water samples (see Appendix 4-1-2) were low compared to plant area groundwater. Dissolved arsenic varied from 0.0198 mg/l to 0.075 mg/l in the fumed slag, and 0.353 to 0.590 mg/l in the unfumed slag during the study period. Dissolved cadmium varied from 0.003 to 0.075 mg/l in the fumed slag, and 0.003 to 0.0063 mg/l in the unfumed slag. Dissolved lead varied from 0.016 to 0.045 mg/l in the fumed slag, and 0.021 to 0.098 mg/l in the unfumed slag.

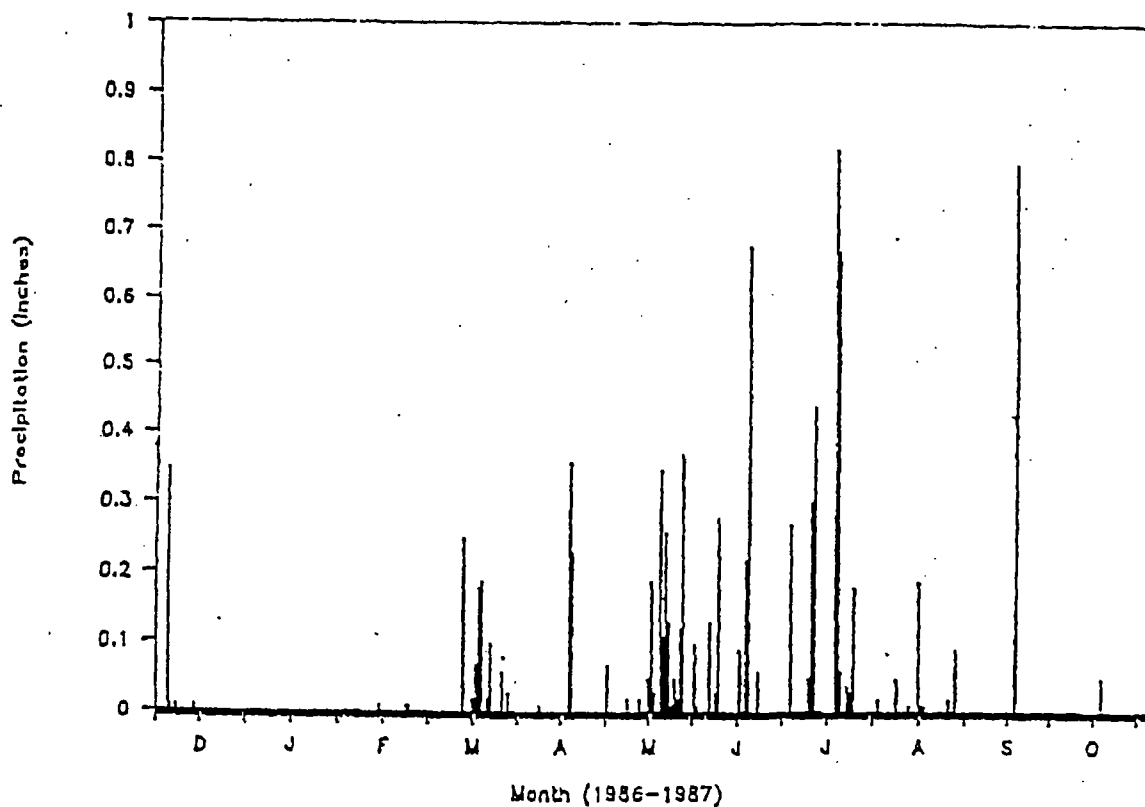
The concentrations of arsenic and metals from bottle roll testing (See Appendix 4-1-2) were similar to the slag test basin water quality. For the fumed slag, dissolved arsenic was 0.19 mg/l, cadmium was 0.003 mg/l, and lead was less than 0.017 mg/l. For the unfumed slag, dissolved arsenic was 0.31 mg/l, cadmium was 0.003 mg/l and lead was 0.083 mg/l.

EP toxicity tests (see Appendix 4-1-2) indicate that leachable trace element concentrations from the slag are variable. From 18 tests, the results for arsenic varied from below detection level to 1.2 ppm with an average of 0.16 ppm; cadmium varied from below detection level to

TABLE 4-1-10. PRECIPITATION COLLECTED IN SLAG TEST BASINS

FUMED SLAG			
Date	Precipitation (inches)	Precipitation Retained *	Percent of Precipitation Retained
12/23/86			
1/22/86	0		
2/23/87	0		
3/26/87	0.75	0.01	1.4
4/21/87	0.23	-0.01	-5.8
5/18/87	0.51	0.32	61.9
6/18/87	2.46	0.49	19.8
7/14/87	0.88	0.25	28.7
8/11/87	1.70	0.36	21.2
9/11/87	0.37	not calculated	
10/14/87	0.65	0.25	38.4
12/7/87	0.45	-0.02	-3.9
1/20/88	0.34	-0.02	-6.7
2/10/88	0.49	-0.01	-1.1
UNFUMED SLAG			
12/23/86			
1/22/87	0		
2/23/87	0		
3/26/87	0.75	0	
4/21/87	0.23	0.12	52.7
5/18/87	0.51	0.27	53.6
6/18/87	2.46	0.73	29.8
7/14/87	0.88	0.28	31.7
8/11/87	1.70	0.12	7.2
9/11/87	0.37	not calculated	
10/14/87	0.65	0.40	61.8
12/7/87	0.45	-0.05	-12.1
1/20/88	0.34	-0.15	-45.0
2/10/88	0.49	0.14	27.6

\* Value is calculated based on measured water level changes and test basin geometry (Frustum of a general pyramid). Negative values indicate evaporation exceeds infiltration.



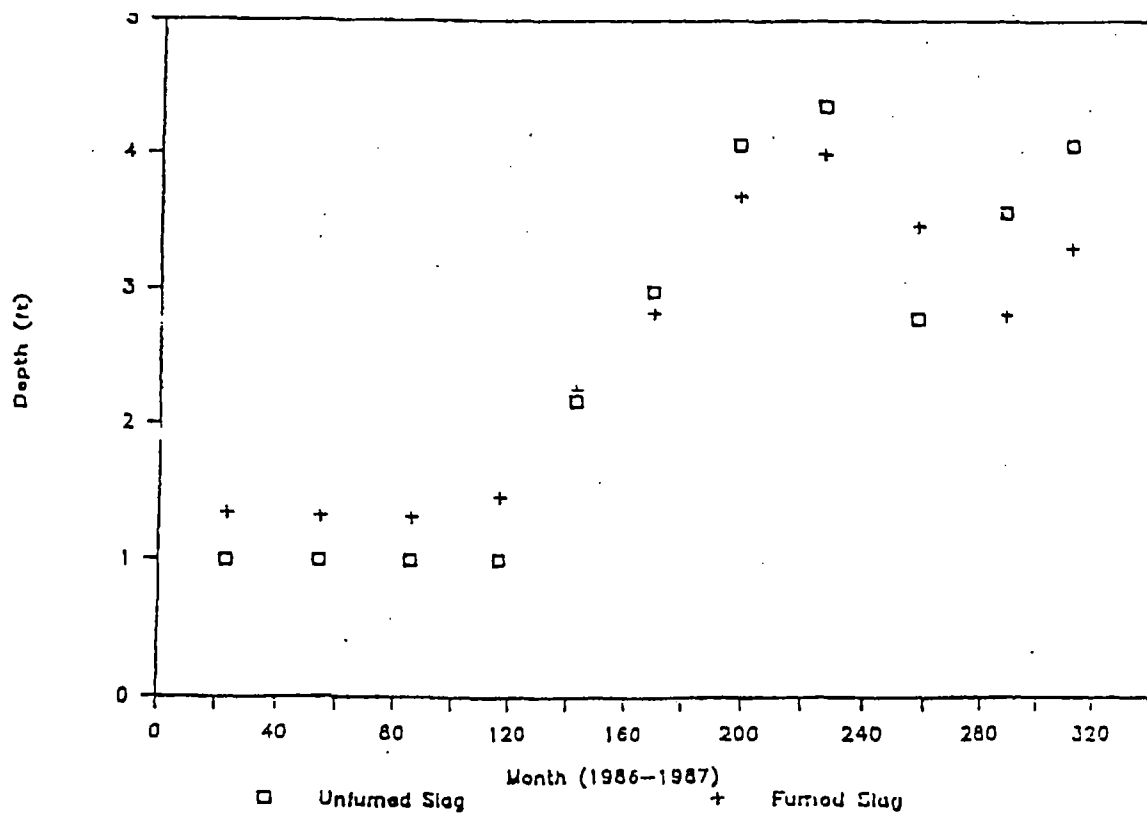
CC/RA REPORT  
ASARCO EAST HELENA  
FACILITY

DAILY PRECIPITATION  
AT HELENA AIRPORT

FIGURE

4-1-9





CC/RA REPORT  
ASARCO EAST HELENA  
FACILITY

DEPTH OF WATER IN  
SLAG TEST BASIN

FIGURE

4-1-10

3.9 ppm, with an average of 0.26 ppm (only one cadmium value was greater than 0.25 ppm; if the 3.9 ppm value is dropped, the cadmium average concentration is 0.04 ppm); lead values varied from below detection level to 30 ppm, with an average of 5.2 ppm.

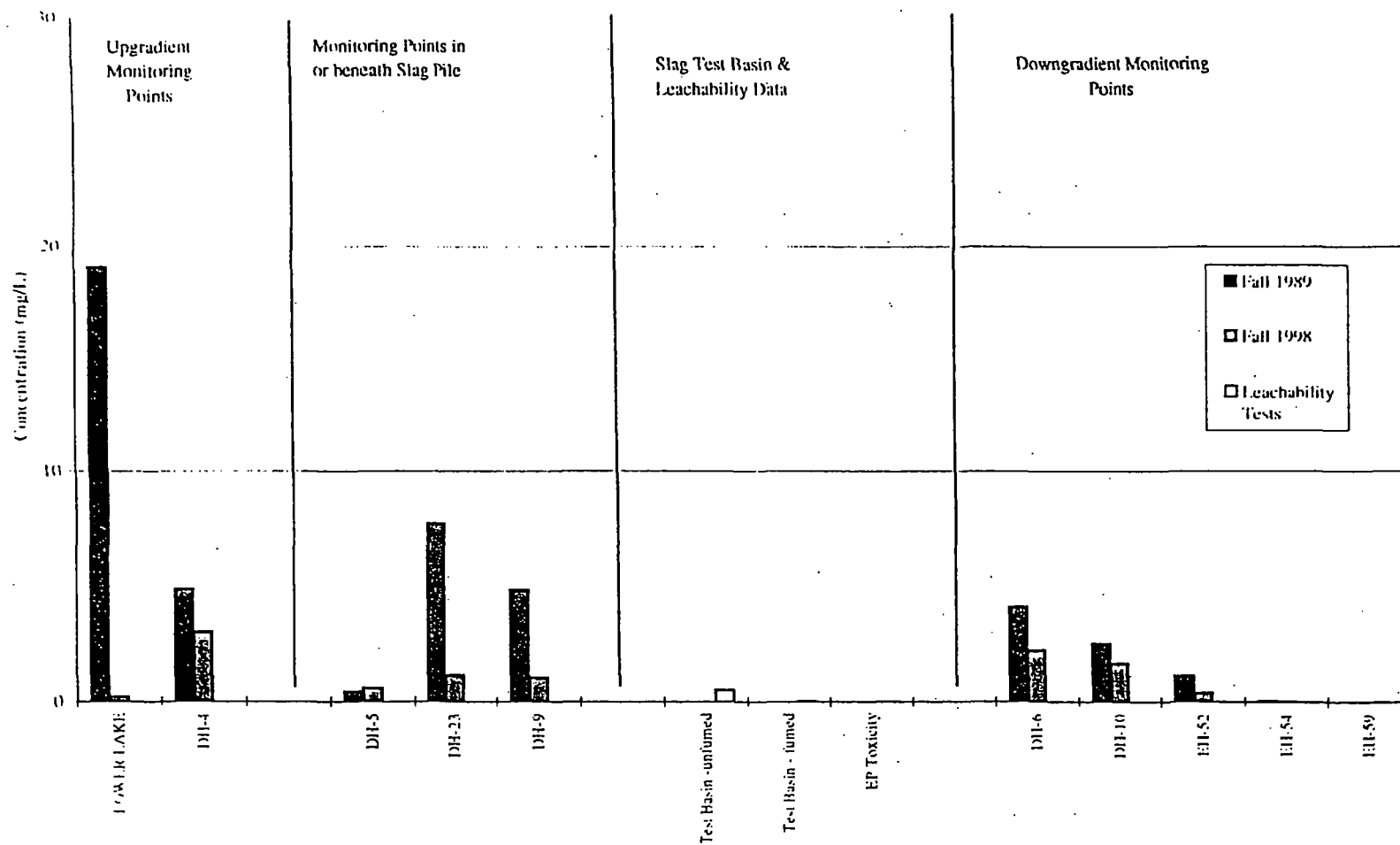
The EP Toxicity tests were not conducted as part of the Comprehensive RI/FS activities, but have been included as supplementary data. The EP Toxicity results tend to overpredict the mobility of metals compared to the other test results and observed site conditions due to the low pH of the extractant. In particular, the values for lead appear to be much higher with TCLP than with natural conditions.

Concentrations of arsenic and other metals in the groundwater system are discussed in detail in Section 4.4. In general, results of water quality from the slag basins and bottle roll analyses of slag indicate arsenic concentrations are significantly lower than concentrations observed in monitoring wells both upgradient and downgradient of the slag pile. Figures 4-1-11, 4-1-12, 4-1-13 and 4-1-14 show a comparison to slag test basin water quality, bottle roll test water quality, EP Tox test results, and groundwater quality upgradient and down gradient of the slag pile.

Based on observed recharge rates in the slag test basins and associated water quality data, the slag pile would account for only 1 to 3 percent of the observed arsenic at downgradient monitoring well DH-10 (see Figure 4-1-15). Concentrations of arsenic in these wells are similar to arsenic concentrations in DH-4 near Lower Lake, the apparent source of elevated arsenic in these wells. Based on the results of test basin water quality analyses and bottle roll tests, it is unlikely that slag significantly effects observed arsenic concentration trends on the site.

While EP-Toxicity results indicate that there is some potential for mobility of cadmium, lead and zinc from slag, the results of the test basins and bottle roll tests indicate metals concentrations released from slag is low. In addition, concentrations of cadmium, lead and

FIGURE 4-1-11. ARSENIC CONCENTRATION DATA FROM GROUNDWATER MONITORING WELLS IN THE SLAG PILE AREA, AND FROM SLAG TEST BASIN AND SLAG LEACHABILITY TESTING RESULTS



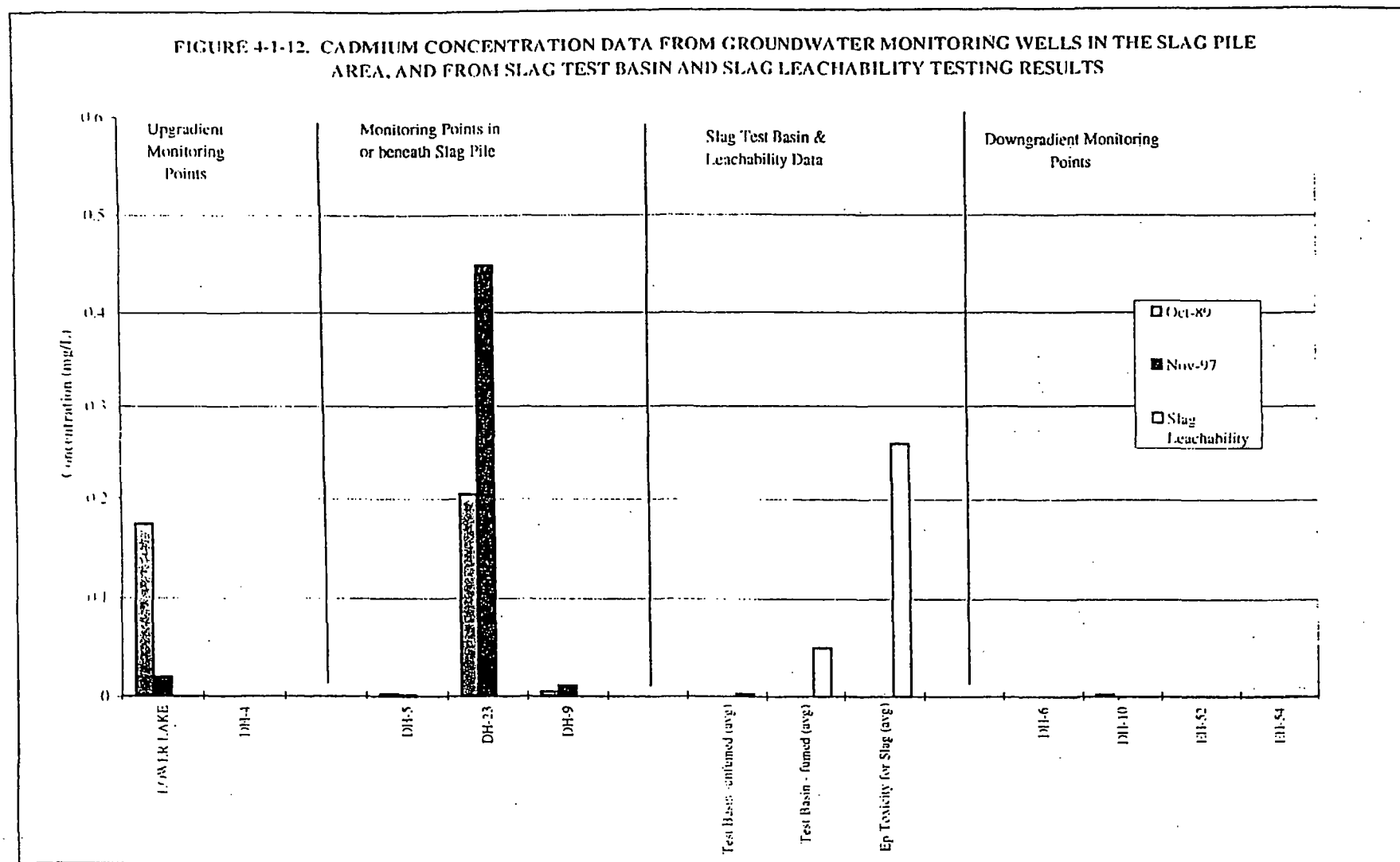


FIGURE 4-1-13. LEAD CONCENTRATION DATA FROM GROUNDWATER MONITORING WELLS IN THE SLAG PILE AREA, AND FROM SLAG TEST BASIN AND SLAG LEACHABILITY TESTING RESULTS

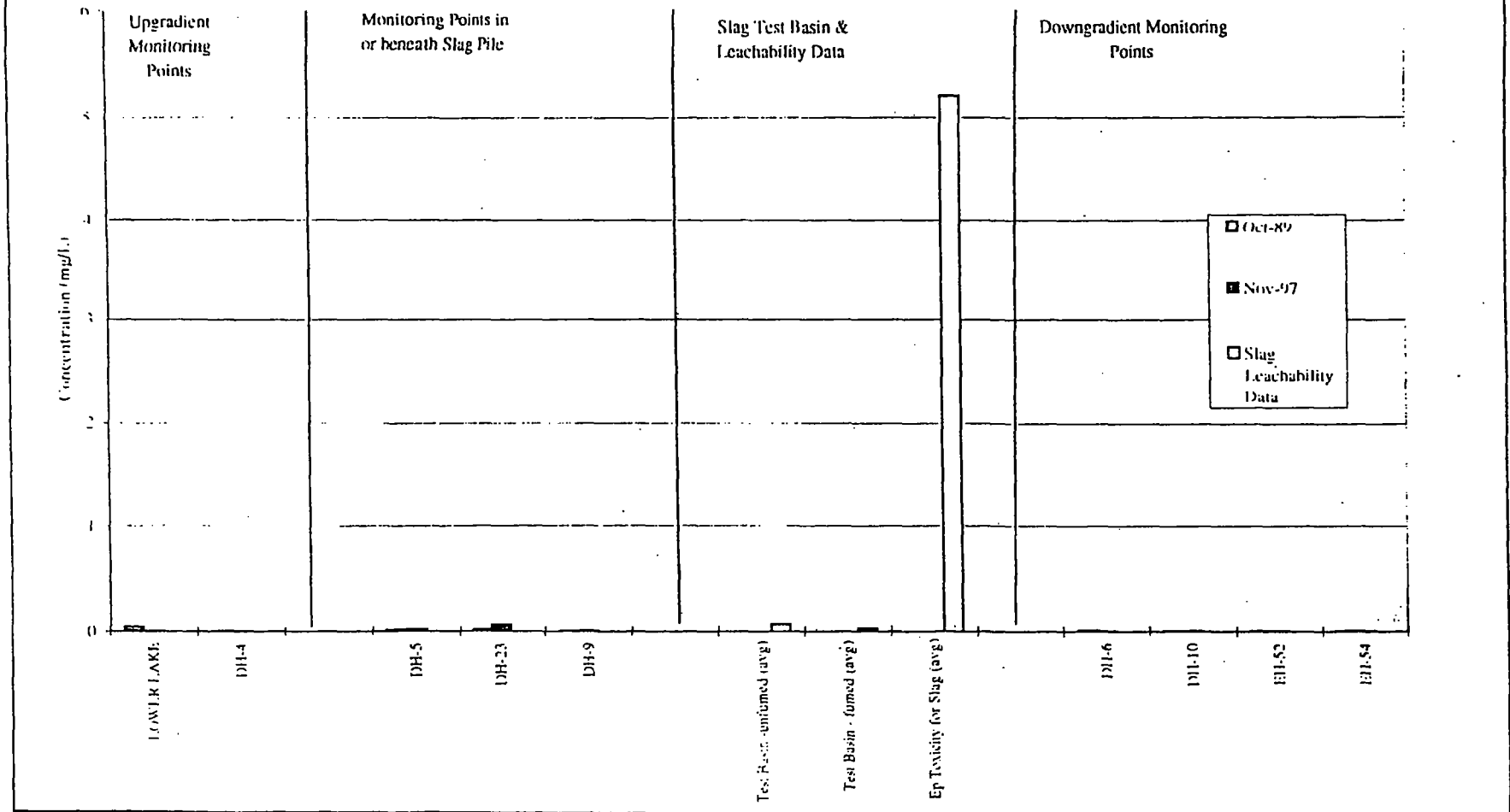
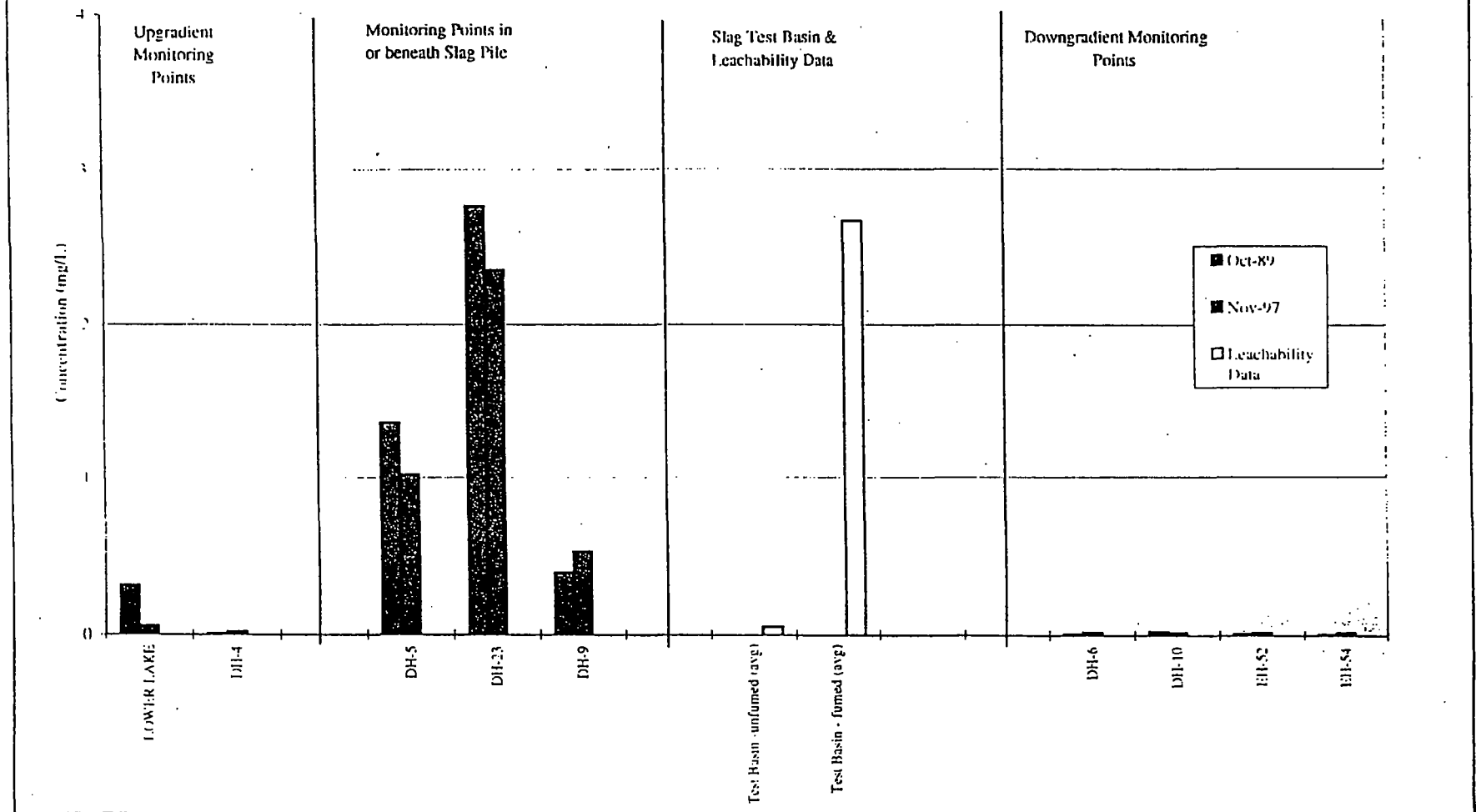


FIGURE 4-1-14. ZINC CONCENTRATION DATA FROM GROUNDWATER MONITORING WELLS IN THE SLAG PILE AREA, AND FROM SLAG TEST BASIN AND SLAG LEACHABILITY TESTING RESULTS



**FIGURE 4-1-15. CALCULATED ARSENIC LOADING FROM SLAG VS  
ARSENIC LOAD IN DOWN-GRADIENT GROUNDWATER**

Data Source	Arsenic Conc.(1)	Arsenic Load (2)	% of GW Load (3)
<b>Test Basin Data</b>			
Fumed Slag	0.036 mg/L	0.003 lb/day	0.20%
Unfumed Slag	0.53 mg/L	0.044 lb/day	2.40%
Average	0.28 mg/L	0.022 lb/day	1.30%
Max	0.59 mg/L	0.047 lb/day	2.60%
EP toxicity (avg. of 18 tests)	0.16 mg/L	0.013 lb/day	0.70%
Groundwater Load	2.13 mg/L (4)	1.8 lb/day (4)	

**Notes**

(1) Source RI/FS Appendix 6-1

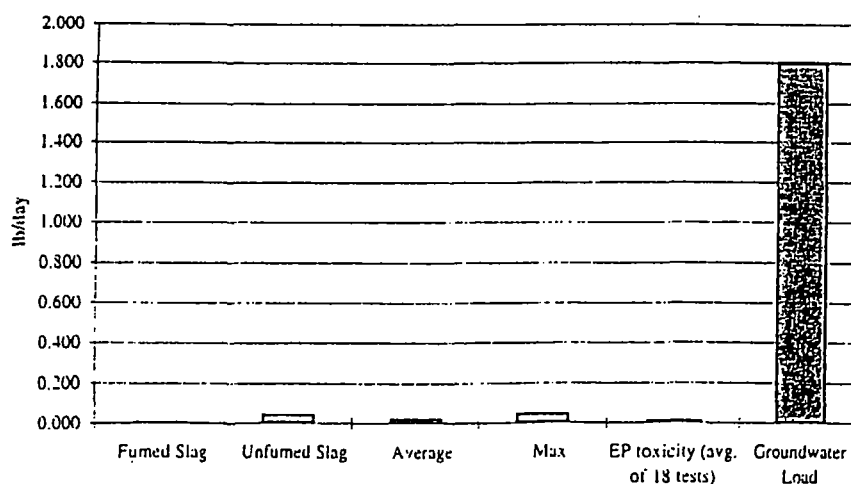
(2) Slag load calculations assume:  
20% infiltration (slag test basin average)  
11.3 in/yr ppt  
57 acre slag pile area

(3) Calculations based on 1.8 lb/day GW arsenic load assuming:  
east side groundwater flux of 70 gpm  
east side groundwater arsenic concentration of 2.13 mg/L

(4) Groundwater Load assumptions  
Groundwater As Concentration 2.13 mg/L (avg from DH-10)  
Groundwater flux = 70 gpm

(K:\DATA\PROJECT\0867\WQ.XLS)

**Arsenic Load**



zinc is also very low. Based on the results of test basin water quality analyses, bottle roll tests, and down gradient groundwater quality, it is unlikely that slag effects observed groundwater quality trends on the site.

Stratigraphic cross-sections showing the slag pile and underlying stratigraphy (Figure 4-1-16) shows the relationship of the slag pile and underlying strata, including the perched alluvial horizon and the underlying coarser grained alluvial aquifer. Based on monitoring well stratigraphy, it is likely the perched horizon at least partially underlies the slag pile. However, there is no evidence of the perched horizon in downgradient wells (see DH-6 and DH-10). As a result, direct impacts from the slag pile at these wells is unlikely since the perched horizon is absent, and the wells are completed in the coarse grained alluvium. However, as noted above, test basin and laboratory test results indicate potential water quality impacts from the slag are low and are not responsible for the water quality concentration observed in downgradient wells.

#### **4.1.4.2 Potential Surface Water Impacts**

The potential for runoff transport in the slag pile area is very low due to the coarse, granular nature of the slag pile, which allows extremely rapid infiltration. Even during high precipitation events no runoff has been observed from the slag pile. Similarly seeps from the face of the slag pile have not been observed. The potential for impacts to surface water are, therefore, limited to direct contact and erosion of the slag pile where it forms steep sided banks adjacent to Prickly Pear Creek. Prickly Pear Creek is in immediate contact with the slag pile between PPC-5 and PPC-6, and adjacent to the slag pile from PPC-6 to PPC-7 (see Exhibit 3-2-1).

The 1990 Comprehensive RI/FS (Hydrometrics, 1990a) examined water quality data from Prickly Pear Creek to assess the potential impact of the slag pile on the creek. No consistent concentration or load increases were apparent in Prickly Pear Creek adjacent to the slag pile (between PPC-5 and PPC-7). The RI/FS therefore concluded that the contribution of arsenic and metals to surface water from slag is very minor. RI/FS and Post RI/FS water quality data



for Prickly Pear Creek are presented and discussed in Section 4.3 of this report and post-RI/FS water quality data are generally consistent with the RI/FS findings. Average metal concentrations show only small differences between stations PPC 5, PPC 7 and PPC 8 (see Figure 4-1-17). Only one high flow stream event (May 1994) shows a pronounced increase in total arsenic load between PPC-5 and PPC-7 (see Figure 4-3-9 in Section 4.3); however, arsenic concentrations decreased from PPC-5 to PPC-7 in the May 1994 event. The calculated load increase is therefore entirely a function of the flow measurement. Since the accuracy of the flow measurements is poor during higher flow events due to increased velocities and turbulence (particularly at PPC-5 below the dam) the apparent load increase during May 1994 is probably the result of flow measurement error. The conclusion of the surface water analysis is that there is little evidence for transport of arsenic and metals from the slag pile with the possible exception being direct erosion of the slag during infrequent high stream flow events.

#### **4.24.2 PROCESS FLUIDS**

As part of the Comprehensive RI/FS (Hydrometrics 1990a), the Process Fluids Operable Unit was divided into two sub-units: Process Ponds and Process Fluid Transport Circuits.

##### **4.14.2.1 Process Ponds**

The Process Ponds include:

- Lower Lake,
- Former Thornock Lake, and
- The acid plant water treatment facility.

As described in Sections 1 and 3, the Process Ponds were addressed by the Process Ponds RI/FS (Hydrometrics, 1989), a subsequent Process Ponds ROD (US EPA, 1989), and several RD/RA documents, and remedial actions that consisted primarily of sediment excavation. The 1989 Process Pond RI consisted of:

## ASARCO TECHNICAL SERVICES CENTER

## ANALYTICAL DATA REPORT

East Helena

Technical Services (Project 3101)

Batch No: L010790

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
--------	----------------	-------------	-----------	-------	-------	---------	---------------	-----------	--------

L010790-002 23-MAY-01 FUMED ASARCO SLAG

AG	0.003	μ	MJF	18-JUN-01	ICP
AL	2.32	μ	MJF	18-JUN-01	ICP
AS	0.022	μ	MJF	18-JUN-01	ICP
BA	0.34	μ	MJF	18-JUN-01	ICP
BE	<0.02	μ	MJF	18-JUN-01	ICP
CR	0.036	μ	MJF	18-JUN-01	ICP
CU	0.32	μ	MJF	18-JUN-01	ICP
HC	2.7	ppm	MO	21-JUN-01	COLD VAPOR AA
MN	1.37	μ	MJF	18-JUN-01	ICP
NI	<0.02	μ	MJF	18-JUN-01	ICP
PB	0.036	μ	MJF	18-JUN-01	ICP
SB	0.026	μ	MJF	18-JUN-01	ICP
SE	<0.02	μ	MJF	18-JUN-01	ICP
TL	<0.02	μ	MJF	18-JUN-01	ICP
V	<0.02	μ	MJF	18-JUN-01	ICP
Zn	1.63	μ	MJF	18-JUN-01	ICP

## ASARCO TECHNICAL SERVICES CENTER

## ANALYTICAL DATA REPORT

East Helena

Technical Services (Project 3101)

Batch No: L010791

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
--------	----------------	-------------	-----------	-------	-------	---------	---------------	-----------	--------

L010791-002 23-MAY-01 FUMED ASARCO SLAG (TCLP)

AG	<0.050	ppm	ESH	08-JUN-01	6010
AS	<0.10	ppm	ESH	08-JUN-01	6010
BA	1.4	ppm	ESH	08-JUN-01	6010
BE	<0.005	ppm	ESH	08-JUN-01	6010
CD	<0.050	ppm	ESH	08-JUN-01	6010
CR	<0.10	ppm	ESH	08-JUN-01	6010
HG	<0.50	ppb	MO	07-JUN-01	7470
NI	<0.10	ppm	ESH	08-JUN-01	6010
PB	0.23	ppm	ESH	08-JUN-01	6010
PH	9.2	pH	MO	05-JUN-01	150.1
SE	<0.10	ppm	ESH	08-JUN-01	6010
TL	<0.10	ppm	ESH	08-JUN-01	6010
V	<0.10	ppm	ESH	08-JUN-01	6010
ZN	17	ppm	ESH	08-JUN-01	6010

Vince Kelt  
ApprovedVince Kelt  
Reviewer

**2008 CLEANING AND DEMOLITION PROJECT  
ASARCO EAST HELENA PLANT**

**2008 WORK PLAN**

**APPENDIX C**

**March 2008**

**EXAMPLE INSPECTION FORM**

## INTERIM CAP INSPECTION CHECKLIST

AREA INSPECTED	Area No.		Inspected by:	DATE:		
	ITEM NO.	CONDITION	OBSERVATION	ACTION NEEDED		
				MONITOR	INVESTIGATE	REPAIR
INTERIM LINER SYSTEMS	1	Exposed liner				
	2	Sand Bags				
	3	Liner Seams				
	4	Liner/Concrete Attachments				
	5	Site Drainage				
Additional Comments:						





# ASARCO LLC EAST HELENA PLANT

## 2008 CLEANING & DEMOLITION PROJECT

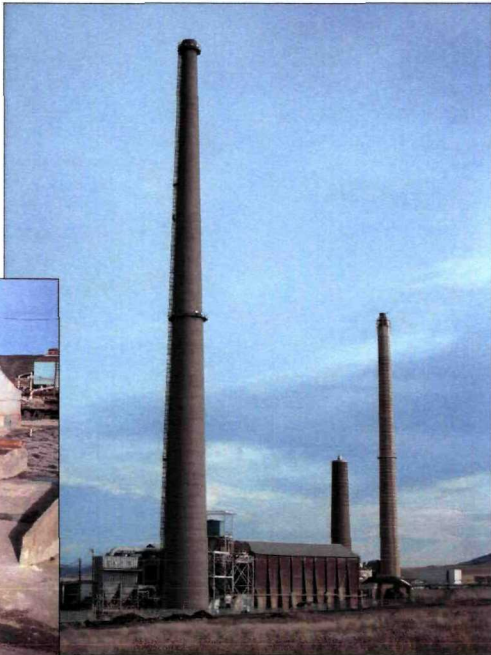
MAY 2008



BLAST FLUE UNDERPASS



CRUSHING/SAMPLE MILL AREA



THREE STACKS AND BAGHOUSE

LEGEND

- 2008 DEMOLITION
- 2007 AND PRIOR DEMOLITION
- DETAIL NUMBER
- PAGE ON WHICH DETAIL IS SHOWN

ABBREVIATIONS

- |             |                       |
|-------------|-----------------------|
| B.F.        | BLAST FURNACE         |
| BLDG.       | BUILDING              |
| CONC.       | CONCRETE              |
| CONV.       | CONVEYOR              |
| CY          | CUBIC YARDS           |
| Ø           | DIAMETER              |
| EL., ELEV.  | ELEVATION             |
| EX., EXIST. | EXISTING              |
| FCE         | FURNACE               |
| I.E.        | INVERT ELEVATION      |
| LF          | LINEAL FOOT           |
| LIQ.        | LIQUID                |
| M.C.C.      | MOTOR CONTROL CENTER  |
| MISC.       | MISCELLANEOUS         |
| MPC         | NORTHWEST ENERGY      |
| MW          | MONITORING WELL       |
| N.G.        | NATURAL GAS           |
| OC          | ON CENTER             |
| PB          | LEAD BEARING MATERIAL |
| R, RAD.     | RADIUS                |
| SCH, SCHED. | SCHEDULE              |
| SY          | SQUARE YARDS          |
| TYP.        | TYPICAL               |
| V           | VERTICAL              |
| W, WTR.     | WATER                 |
| W/          | WITH                  |

DRAWING LIST

DWG. NO.	TITLE
GENERAL SHEETS	
1	DRAWING INDEX & SITE VICINITY MAP
2	SITE PLOT PLAN
3	WASTE LOCATION MAP
4	ASBESTOS SURVEY LOCATION MAP
5	ACTIVE UTILITIES
6	UNDERGROUND UTILITIES ABANDONED
7	UNDERGROUND UTILITIES TO BE FLOW FILLED
2008 DEMOLITION PLAN SHEETS	
8	2008 DEMOLITION - PLAN
9	2008 DEMOLITION - STACK AND BAGHOUSE AREA
10	2008 DEMOLITION - MONIER FLUE AND ACID PLANT AREA
11	2008 DEMOLITION - CRUSHING AND SAMPLE MILL AREA
12	2008 DEMOLITION - BLAST FURNACE FLUE AREA
TEMPORARY CAP PLAN SHEETS	
13	2008 COVER SYSTEM AND INTERIM CAP - PLAN
14	DETAILS

NO	BY	DATE	DESCRIPTION

SCALE VERIFICATION  
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1  
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

Project No.:	7054
DRAWN BY	SDP 1/17/07
CHECKED BY	MWR 1/23/07
APPROVED BY	MJO 1/24/07
SCALE:	AS NOTED




**Hydrometrics, Inc.**  
Consulting Scientists and Engineers  
  
Helena, Montana 59601  
3025 Beaman Avenue  
(406) 445-4150

ASARCO LLC - EAST HELENA PLANT  
2008 CLEANING & DEMOLITION PROJECT  
  
DRAWING INDEX &  
SITE VICINITY MAP

DRAWING FILE NUMBER
705403H003.dwg
AUTOCAD 2004 DRAWING (DWG)
SHEET NUMBER
1
REV





REVISIONS	NO	BY	DATE	DESCRIPTION	REVISIONS	NO	BY	DATE		SCALE VERIFICATION BAR IS ONE INCH ON ORIGINAL DRAWING  0  1  IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	Project No.: 7054	<b>Hydrometrics, Inc.</b>  Consulting Scientists and Engineers		<b>ASARCO LLC - EAST HELENA PLANT</b> <b>2008 CLEANING &amp; DEMOLITION PROJECT</b>	DRAWING FILE NUMBER
											DRAWN BY JSD 12/12/06				705403H004.dwg
											CHECKED BY MWR 1/19/06	AUTOCAD 2004 DRAWING (DWG)			
											APPROVED BY MJQ 1/19/06	SHEET NUMBER			
											Helena, Montana 59601 3000 Broadway Avenue (406) 443-4100	REV			
										SCALE: 1"=100'				SITE PLOT PLAN	2 





**NOTE:**  
THE CLEANING AND DEMOLITION OF THE BLAST FURNACE FLUE AND MONIER FLUE WILL BE GOVERNED BY PROCEDURES SET FORTH IN THE EPA APPROVED INTERIM MEASURES WORK PLAN ADDENDUM (MAY 2008)

- NOTES:**
1. WASTE MATERIALS LISTED ON THIS SHEET ARE APPROVED FOR DISPOSAL IN THE CAMU.
  2. TRANSPORT LUBRICATING OILS AND TRANSFORMER OILS (NON PCB) LOCATED THROUGHOUT THE DEMOLITION AREA TO THE SHOP STORAGE SHED AND PLACE IN THE USED OIL TANK. THEY ARE NOT APPROVED FOR PLACEMENT IN THE CAMU.
  3. SULFATES AND SULFURIC ACID LOCATED THROUGHOUT THE PIPING, TOWERS, AND TANKS WITHIN THE ACID PLANT AREA MUST BE REMOVED PRIOR TO DEMO. FOLLOW PROPER PROTOCOL (MSDS PROCEDURES) WHEN HANDLING AND TRANSPORTING ANY HAZARDOUS MATERIAL.
  4. REMOVE ALL DUST AND LEAD RESIDUE FROM THE BLAST FURNACE FLUE, MONIER FLUE, BAGHOUSE #1, 2, 3, AND CONVERTER CONTAINING CATALYST PRIOR TO DEMOLITION OF THESE STRUCTURES IN ORDER TO MINIMIZE DUST. THIS TASK WILL REQUIRE VACUUMING.

**LEGEND**

- 2007 AND PRIOR DEMOLITION WORK  
--- EXTENSIVE CLEANING NEEDED PRIOR TO DEMOLITION

**WASTE MATERIALS**

- (G) CATALYST  
(H) SULFATES AND SULFURIC ACID

NO	BY	DATE	DESCRIPTION	NO	BY	DATE	DESCRIPTION

SCALE VERIFICATION  
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1  
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

Project No.: 7054  
DRAWN BY: JSD 1/19/07  
CHECKED BY: MWR 1/24/07  
APPROVED BY: MJG 1/24/07  
SCALE: 1"=75'

**Hydrometrics, Inc.**  
Consulting Scientists and Engineers  
Helena, Montana 59601  
3000 Bowman Avenue  
(406) 448-4390

**ASARCO LLC - EAST HELENA PLANT**  
**2008 CLEANING & DEMOLITION PROJECT**  
**WASTE**  
**LOCATION MAP**

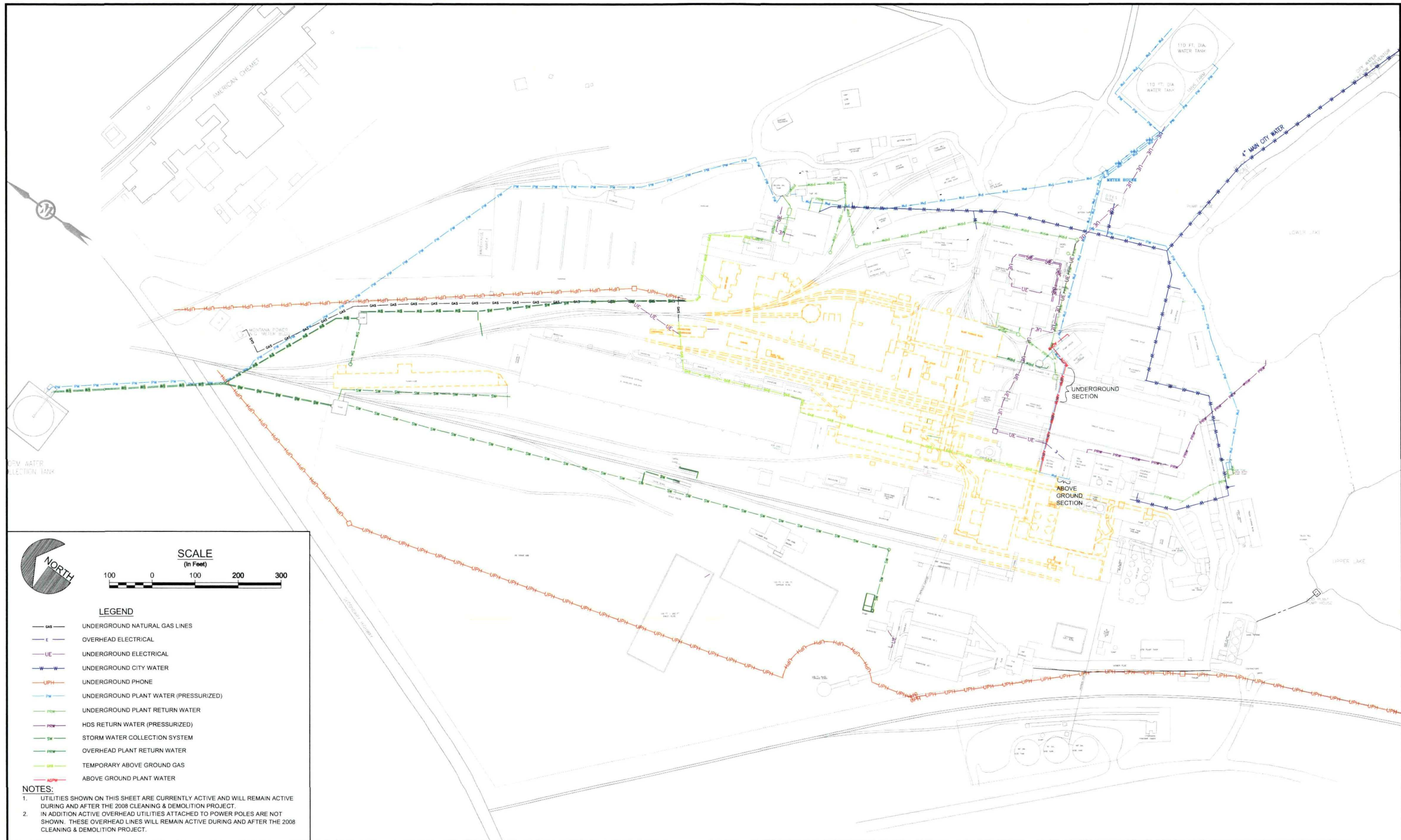
DRAWING FILE NUMBER	REV
705403H005.dwg	
AUTOCAD 2004 DRAWING (DWG)	
SHEET NUMBER	REV
3	





REVISIONS				REVISIONS				SCALE VERIFICATION				Project No.: 7054				Hydrometrics, Inc.				ASARCO LLC - EAST HELENA PLANT				DRAWING FILE NUMBER			
NO				BY				BAR IS ONE INCH ON ORIGINAL DRAWING				DRAWN BY				Consulting Scientists and Engineers				2008 CLEANING & DEMOLITION PROJECT				705403H006.dwg			
DATE				DATE				0 1				CHECKED BY				Helena, Montana 59601				ASBESTOS SURVEY				AUTOCAD 2004 DRAWING (DWG)			
DESCRIPTION				DESCRIPTION				IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY				APPROVED BY				3020 Broadway Avenue				LOCATION MAP				SHEET NUMBER			
																(406) 443-4900								4			





NO	BY	DATE	DESCRIPTION

NO	BY	DATE	DESCRIPTION

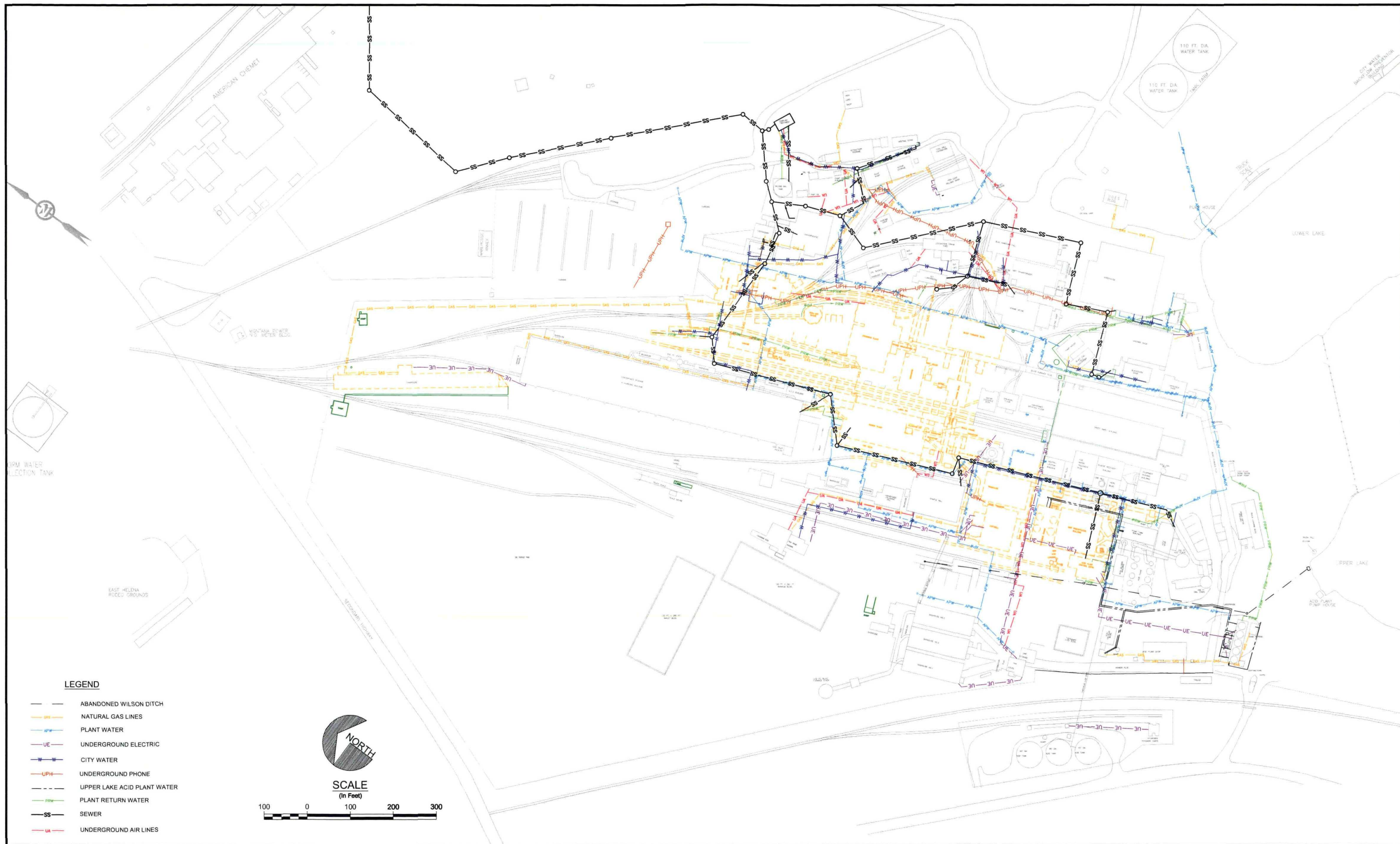
SCALE VERIFICATION  
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1  
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

Project No.: 7054  
DRAWN BY: GWL 1/19/07  
CHECKED BY: MWR 1/19/07  
APPROVED BY: MJG 1/19/07  
SCALE: 1"=100'

**Hydrometrics, Inc.**  
Consulting Scientists and Engineers  
Helena, Montana 59601  
3020 Broadway Avenue  
(406) 443-4900

ASARCO LLC - EAST HELENA PLANT 2008 CLEANING & DEMOLITION PROJECT		DRAWING FILE NUMBER 705403H007.dwg
ACTIVE UTILITIES		SHEET NUMBER 5
		REV △



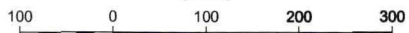


LEGEND

- ABANDONED WILSON DITCH
- NG — NATURAL GAS LINES
- PW — PLANT WATER
- UE — UNDERGROUND ELECTRIC
- CW — CITY WATER
- UPH — UNDERGROUND PHONE
- ULAPW — UPPER LAKE ACID PLANT WATER
- PRW — PLANT RETURN WATER
- SS — SEWER
- UA — UNDERGROUND AIR LINES



SCALE  
(In Feet)



NO	BY	DATE	DESCRIPTION

NO	BY	DATE

SCALE VERIFICATION  
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1  
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

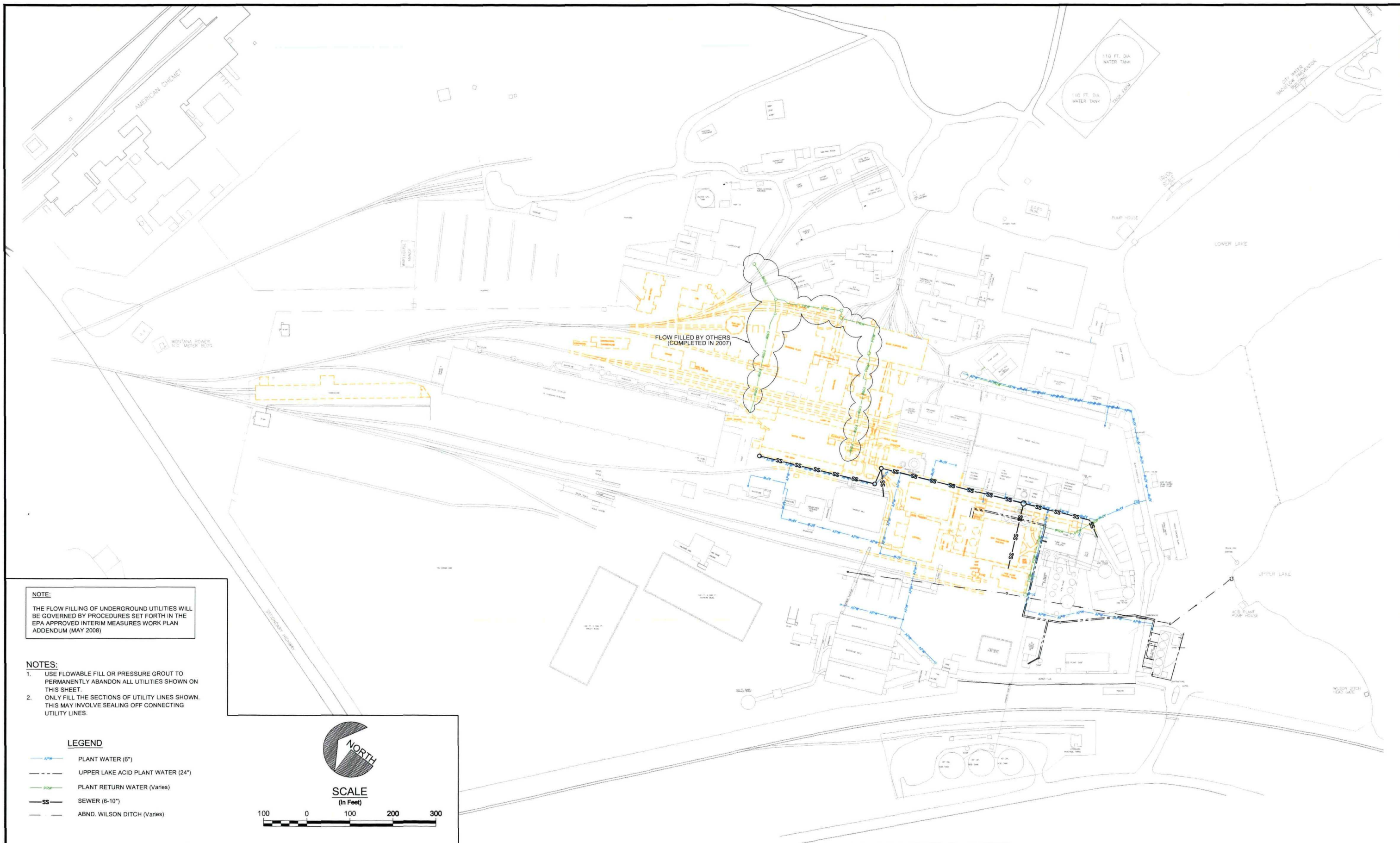
Project No.:	7054
DRAWN BY	GWL 1/19/07
CHECKED BY	MWR 1/19/07
APPROVED BY	MJO 1/24/07
SCALE:	1"=100'

**Hydrometrics, Inc.**  
Consulting Scientists and Engineers  
Helena, Montana 59601  
3020 Bozeman Avenue  
(406) 445-4180

**ASARCO LLC - EAST HELENA PLANT**  
**2008 CLEANING & DEMOLITION PROJECT**  
**UNDERGROUND UTILITIES**  
**ABANDONED**

DRAWING FILE NUMBER	705403H008.dwg
AUTOCAD 2004 DRAWING (DWG)	
SHEET NUMBER	6
REV	





**NOTE:**

THE FLOW FILLING OF UNDERGROUND UTILITIES WILL BE GOVERNED BY PROCEDURES SET FORTH IN THE EPA APPROVED INTERIM MEASURES WORK PLAN ADDENDUM (MAY 2008)

**NOTES:**

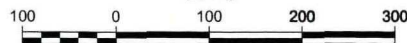
1. USE FLOWABLE FILL OR PRESSURE GROUT TO PERMANENTLY ABANDON ALL UTILITIES SHOWN ON THIS SHEET.
2. ONLY FILL THE SECTIONS OF UTILITY LINES SHOWN. THIS MAY INVOLVE SEALING OFF CONNECTING UTILITY LINES.

**LEGEND**

- APW — PLANT WATER (6")
- UPPER LAKE ACID PLANT WATER (24")
- PRW — PLANT RETURN WATER (Varies)
- SS — SEWER (6-10")
- ABND. WILSON DITCH (Varies)



**SCALE**  
(In Feet)



NO	BY	DATE	DESCRIPTION	NO	BY	DATE	DESCRIPTION

SCALE VERIFICATION  
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1  
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

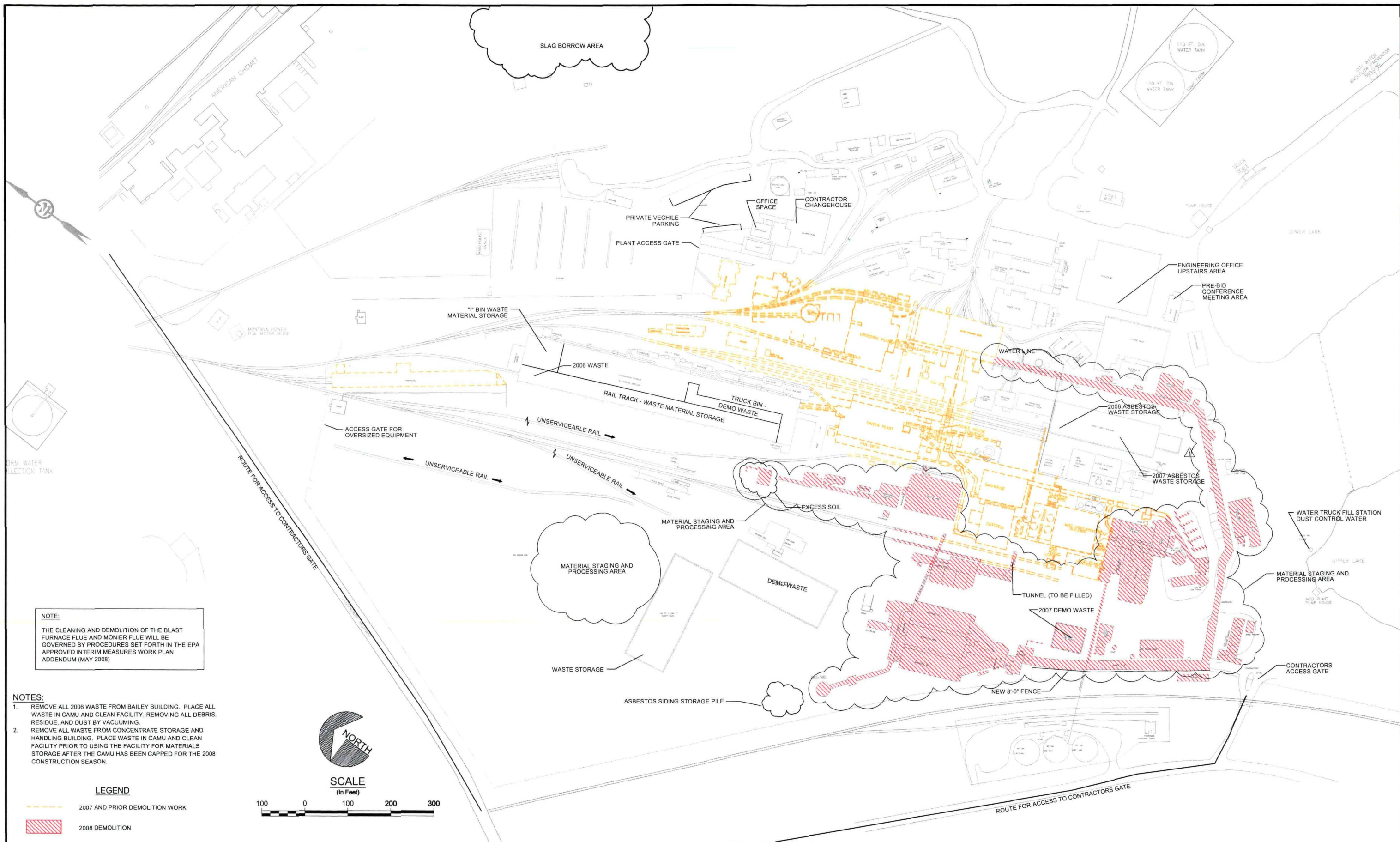
Project No.: 7054  
DRAWN BY: GWL 1/19/07  
CHECKED BY: MWR 1/19/07  
APPROVED BY: MJO 1/24/07  
SCALE: 1"=100'

**Hydrometrics, Inc.**  
Consulting Scientists and Engineers  
Helena, Montana 59601  
3000 Bozeman Avenue  
(406) 443-4189

**ASARCO LLC - EAST HELENA PLANT**  
**2008 CLEANING & DEMOLITION PROJECT**  
**UNDERGROUND UTILITIES**  
**TO BE FLOW FILLED**

DRAWING FILE NUMBER	
705403H009.dwg	
AUTOCAD 2004 DRAWING (DWG)	
SHEET NUMBER	REV
7	△



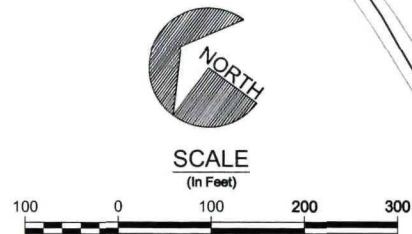


**NOTE:**  
THE CLEANING AND DEMOLITION OF THE BLAST FURNACE FLUE AND MONIER FLUE WILL BE GOVERNED BY PROCEDURES SET FORTH IN THE EPA APPROVED INTERIM MEASURES WORK PLAN ADDENDUM (MAY 2008)

- NOTES:**
1. REMOVE ALL 2006 WASTE FROM BAILEY BUILDING. PLACE ALL WASTE IN CAMU AND CLEAN FACILITY, REMOVING ALL DEBRIS, RESIDUE, AND DUST BY VACUUMING.
  2. REMOVE ALL WASTE FROM CONCENTRATE STORAGE AND HANDLING BUILDING. PLACE WASTE IN CAMU AND CLEAN FACILITY PRIOR TO USING THE FACILITY FOR MATERIALS STORAGE AFTER THE CAMU HAS BEEN CAPPED FOR THE 2008 CONSTRUCTION SEASON.

**LEGEND**

- 2007 AND PRIOR DEMOLITION WORK
- 2008 DEMOLITION



NO				BY				DATE				DESCRIPTION			
REVISIONS				NO				BY				DATE			

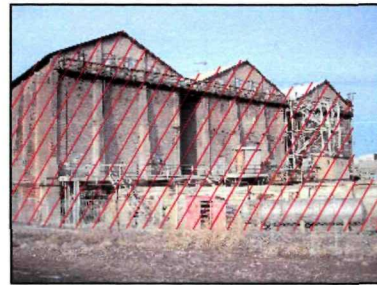
NO				BY				DATE				DESCRIPTION			
REVISIONS				NO				BY				DATE			

SCALE VERIFICATION				Project No.: 7054				<b>Hydrometrics, Inc.</b>				ASARCO LLC - EAST HELENA PLANT			
BAR IS ONE INCH ON				DRAWN BY JSD 1/19/06				Consulting Scientists and Engineers				2008 CLEANING & DEMOLITION PROJECT			
ORIGINAL DRAWING				CHECKED BY MWR 1/19/06				Helena, Montana 59601				2008 DEMOLITION			
0 1				APPROVED BY MJQ 1/24/07				2000 Broadway Avenue				PLAN			
IF NOT ONE INCH ON				SCALE: 1"=100'				(406) 448-4180				DRAWING FILE NUMBER			
THIS SHEET, ADJUST												705403H018.dwg			
SCALES ACCORDINGLY												AUTOCAD 2004 DRAWING (DWG)			
												SHEET NUMBER			
												8			
												REV			





P4-18 ORE UNLOADING RAMP & OVERHEAD SUPPORTS



P4-35 BAG HOUSE BUILDINGS & DISTRIBUTION FLUE



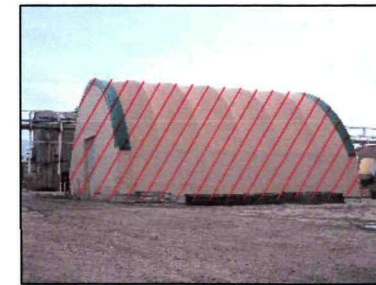
P4-34 FAN HOUSE AND MONIER FLUE



P4-33 FLUE DUCTING AND SUPPORTS



P4-32 MONIER FLUE, OVERHEAD ACID PIPES, & SUPPORTS



P4-31 DUST BUILDING (RINGLING BUILDING)



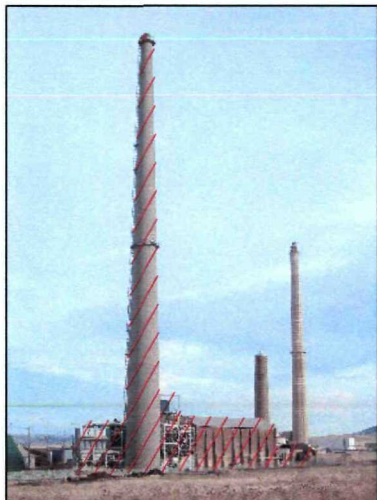
P4-30 FANHOUSE, LIME STORAGE, & FLUE



P4-19 ORE UNLOADING RAMP & MATERIAL BINS



P4-20 ORE BAG HOUSE BUILDINGS & FLUE DUCTING



P4-21 420' STACK & BAGHOUSE



P4-29 RAILROAD TRACKS, ORE UNLOADING RAMP, OVERHEAD SUPPORTS, & BAGHOUSE



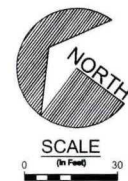
P4-28 BAGHOUSE BUILDING & DUCTING



P4-27 BAGHOUSE BUILDING & DUCTING



P4-26 BAGHOUSE BUILDING & DUCTING



P4-29

P4-27

P4-28

P4-18

P4-26

P4-20

P4-23

P4-22

P4-24

P4-33

P4-19

P4-30

P4-31

P4-32

P4-35

P4-34



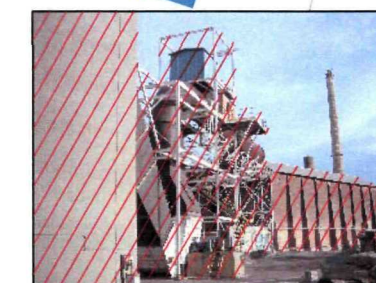
P4-22 BAGHOUSE BUILDINGS



P4-23 BAGHOUSE BUILDINGS & FLUE DUCTING



P4-24 BAGHOUSE BUILDING & FLUE DUCTING SUPPORT



P4-25 420' STACK, BAGHOUSE BUILDING, FLUE DUCTING, & FLUE DUCTING SUPPORTS

- LEGEND**
- 2007 AND PRIOR DEMOLITION WORK
  - EXISTING STRUCTURES
  - 2008 DEMOLITION WORK
  - PHOTO NUMBER AND VIEWING ANGLE
  - MONITORING WELL - DO NOT DEMO

- NOTES:**
- 2008 DEMOLITION STRUCTURES ARE MARKED WITH RED X'S AND STRUCTURES MARKED WITH BLACK X'S ARE TO BE LEFT UNDISTURBED.
  - DEMOLISH STRUCTURES TO EXTERIOR GRADE UNLESS CONSTRUCTED OF BRICK.
  - DEMOLISH BRICK STRUCTURES TO 3 FEET BELOW GRADE.

**NOTE:**

THE CLEANING AND DEMOLITION OF THE BLAST FURNACE FLUE AND MONIER FLUE WILL BE GOVERNED BY PROCEDURES SET FORTH IN THE EPA APPROVED INTERIM MEASURES WORK PLAN ADDENDUM (MAY 2008)

BEACON LIGHTS TO REMAIN ON UNTIL STACK IS DEMOLISHED OR FAA APPROVAL

NEW CHAIN LINK FENCE TO MATCH EXISTING

NO	BY	DATE	DESCRIPTION

NO	BY	DATE	DESCRIPTION

SCALE VERIFICATION BAR IS ONE INCH ON ORIGINAL DRAWING  
0 1  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

Project No.: 7054  
DRAWN BY: JSD/LT 1/17/07  
CHECKED BY: MWR 1/19/07  
APPROVED BY: MJO 1/19/07  
SCALE: 1"=30'

**Hydrometrics, Inc.**  
Consulting Scientists and Engineers  
Helena, Montana 59601  
9000 Business Avenue  
(406) 443-1100

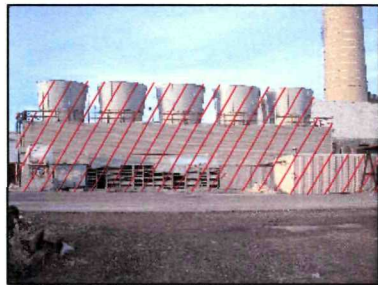
**ASARCO LLC - EAST HELENA PLANT**  
**2008 CLEANING & DEMOLITION PROJECT**  
**2008 DEMOLITION**  
**STACK AND BAGHOUSE AREA**

DRAWING FILE NUMBER	REV
705403H010.dwg	
AUTOCAD 2004 DRAWING (DWG)	
SHEET NUMBER	
9	

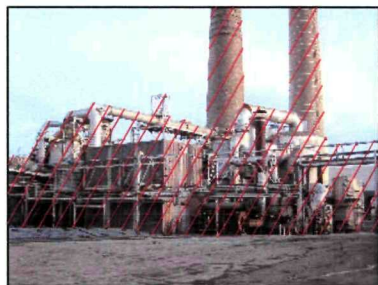




P4-36 MONIER FLUE & TRAILER



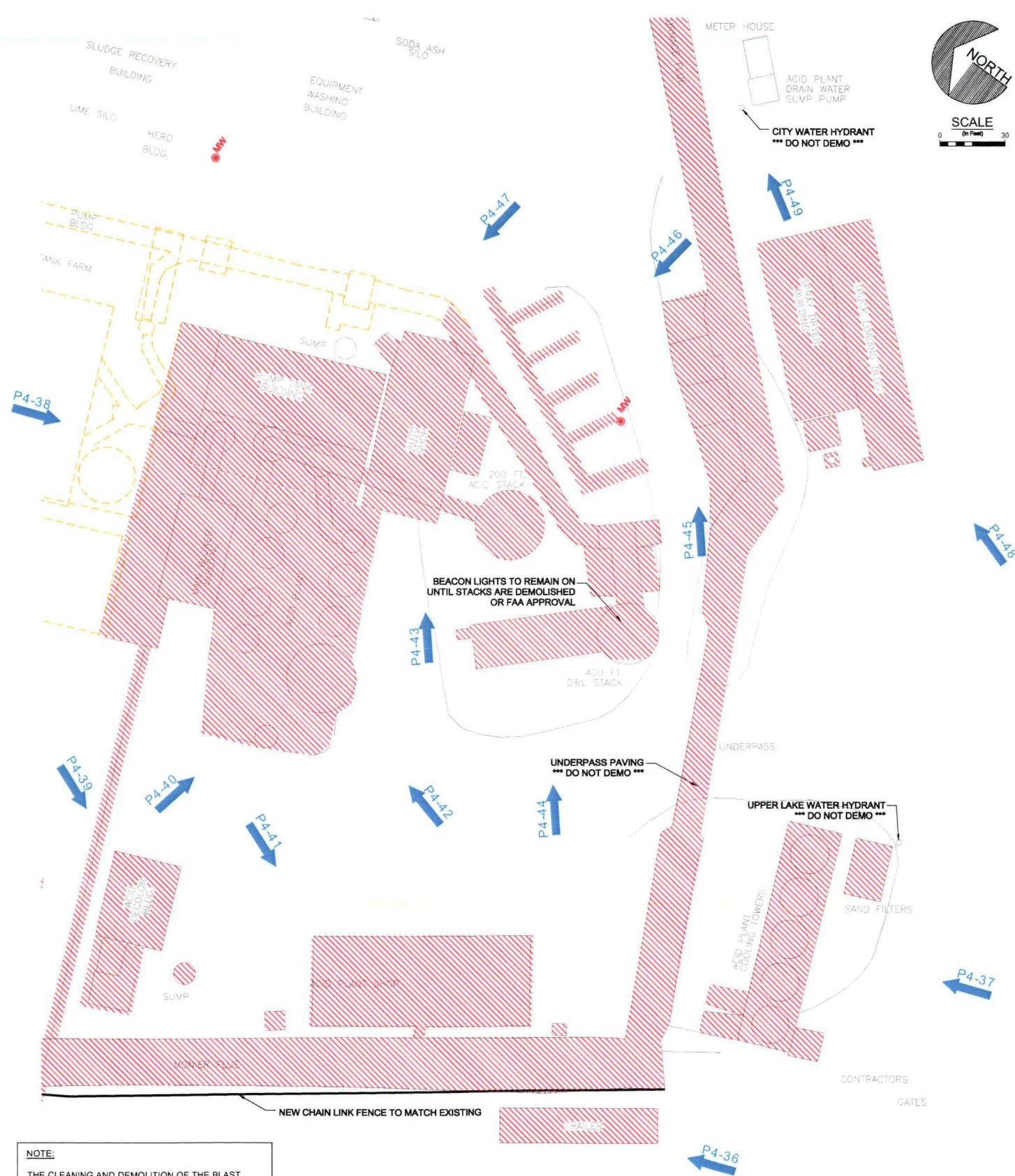
P4-37 ACID PLANT COOLING TOWERS



P4-38 ACID PLANT, MAIN BLOWER BUILDING, & STACKS



P4-39 ACID DECOLOR BUILDING & OVERHEAD ACID PIPELINE



P4-40 ACID PLANT & PIPING



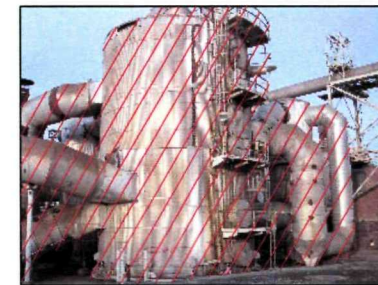
P4-45 FURNACE FLUE



P4-41 ACID PLANT SHOP



P4-46 MATERIAL STORAGE BINS



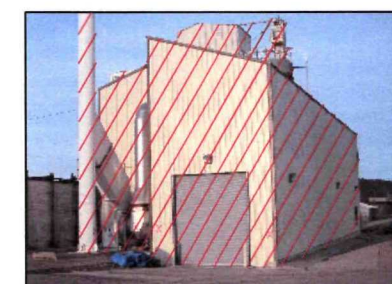
P4-42 ACID PLANT CONVERTOR & PIPING



P4-47 ACID PLANT AND PIPING



P4-43 ACID PLANT, AUTO SHOP, & 200' STACK



P4-48 SPRAY DRYER BUILDING & TRUCK LOADING BUILDING



P4-44 STORAGE BUILDING, 200' STACK, & 400' STACK



P4-49 FURNACE FLUE & OVERHEAD PIPE SUPPORTS

#### LEGEND

- 2007 AND PRIOR DEMOLITION WORK
- EXISTING STRUCTURES
- 2008 DEMOLITION WORK
- P4-41 PHOTO NUMBER AND VIEWING ANGLE
- MW MONITORING WELL - DO NOT DEMO

#### NOTES:

- 2008 DEMOLITION STRUCTURES ARE MARKED WITH RED X'S AND STRUCTURES MARKED WITH BLACK X'S ARE TO BE LEFT UNDISTURBED.
- IT MAY BE NECESSARY TO REMOVE PARTS OF TEMPORARY CAPS PRIOR TO DEMOLITION. ANY DAMAGED OR REMOVED TEMPORARY CAPS MUST BE REPLACED.
- DEMOLISH STRUCTURES TO EXTERIOR GRADE UNLESS CONSTRUCTED OF BRICK.
- DEMOLISH BRICK STRUCTURES TO 3 FEET BELOW GRADE.

#### NOTE:

THE CLEANING AND DEMOLITION OF THE BLAST FURNACE FLUE AND MONIER FLUE WILL BE GOVERNED BY PROCEDURES SET FORTH IN THE EPA APPROVED INTERIM MEASURES WORK PLAN ADDENDUM (MAY 2008)

SCALE VERIFICATION  
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1  
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

Project No.: 7054  
DRAWN BY: JSD/LT 1/17/07  
CHECKED BY: MWR 1/19/07  
APPROVED BY: MJO 1/19/07  
SCALE: 1"=30'

**Hydrometrics, Inc.**  
Consulting Scientists and Engineers  
Helena, Montana 59601  
9020 Business Avenue  
(406) 443-1100

ASARCO LLC - EAST HELENA PLANT  
2008 CLEANING & DEMOLITION PROJECT  
2008 DEMOLITION  
MONIER FLUE AND ACID PLANT AREA

DRAWING FILE NUMBER  
705403H011.dwg  
AUTOCAD 2004 DRAWING (DWG)  
SHEET NUMBER  
10  
REV  
△





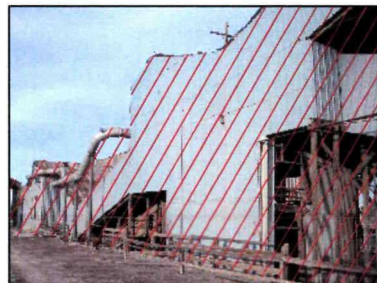
P4-50 NORTH SIDE OF CRUSHING MILL



P4-51 CRUSHING MILL & SUPPORT STRUCTURES



P4-52 WEST SIDE OF CRUSHING MILL



P4-53 WEST SIDE OF CRUSHING MILL

- LEGEND**
- 2007 AND PRIOR DEMOLITION WORK  
EXISTING STRUCTURES
  - 2008 DEMOLITION WORK
  - PHOTO NUMBER AND VIEWING ANGLE
  - MONITORING WELL - DO NOT DEMO

- NOTES:**
- 2008 DEMOLITION STRUCTURES ARE MARKED WITH RED X'S AND STRUCTURES MARKED WITH BLACK X'S ARE TO BE LEFT UNDISTURBED.
  - IT MAY BE NECESSARY TO REMOVE PARTS OF TEMPORARY CAPS PRIOR TO DEMOLITION. ANY DAMAGED OR REMOVED TEMPORARY CAPS MUST BE REPLACED.
  - DEMOLISH STRUCTURES TO EXTERIOR GRADE UNLESS CONSTRUCTED OF BRICK.
  - DEMOLISH BRICK STRUCTURES TO 3 FEET BELOW GRADE.



P4-54 BAGHOUSE AND SOUTH SIDE OF CRUSHING MILL



P4-55 SAMPLE MILL



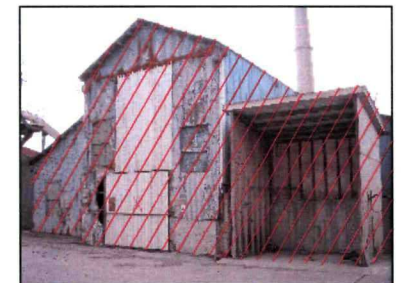
P4-56 SOUTH SIDE OF SAMPLE MILL



P4-57 EAST SIDE OF SAMPLE MILL & DUST LOAD OUT



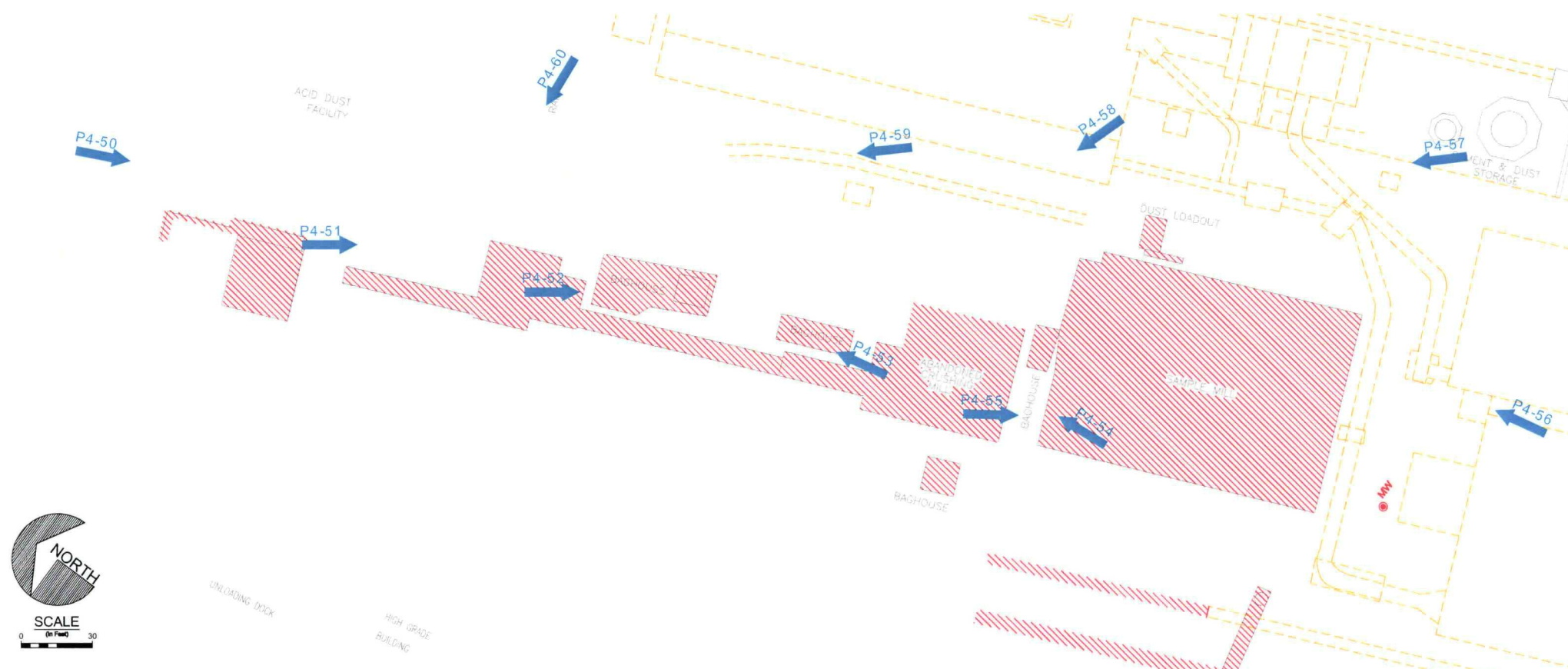
P4-58 EAST SIDE OF CRUSHING MILL & BAGHOUSE



P4-60 CRUSHING MILL & STORAGE BUILDING



P4-59 EAST SIDE OF CRUSHING MILL & BAGHOUSES



NO	BY	DATE	DESCRIPTION

SCALE VERIFICATION  
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1  
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

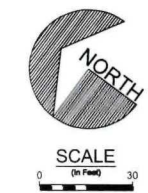
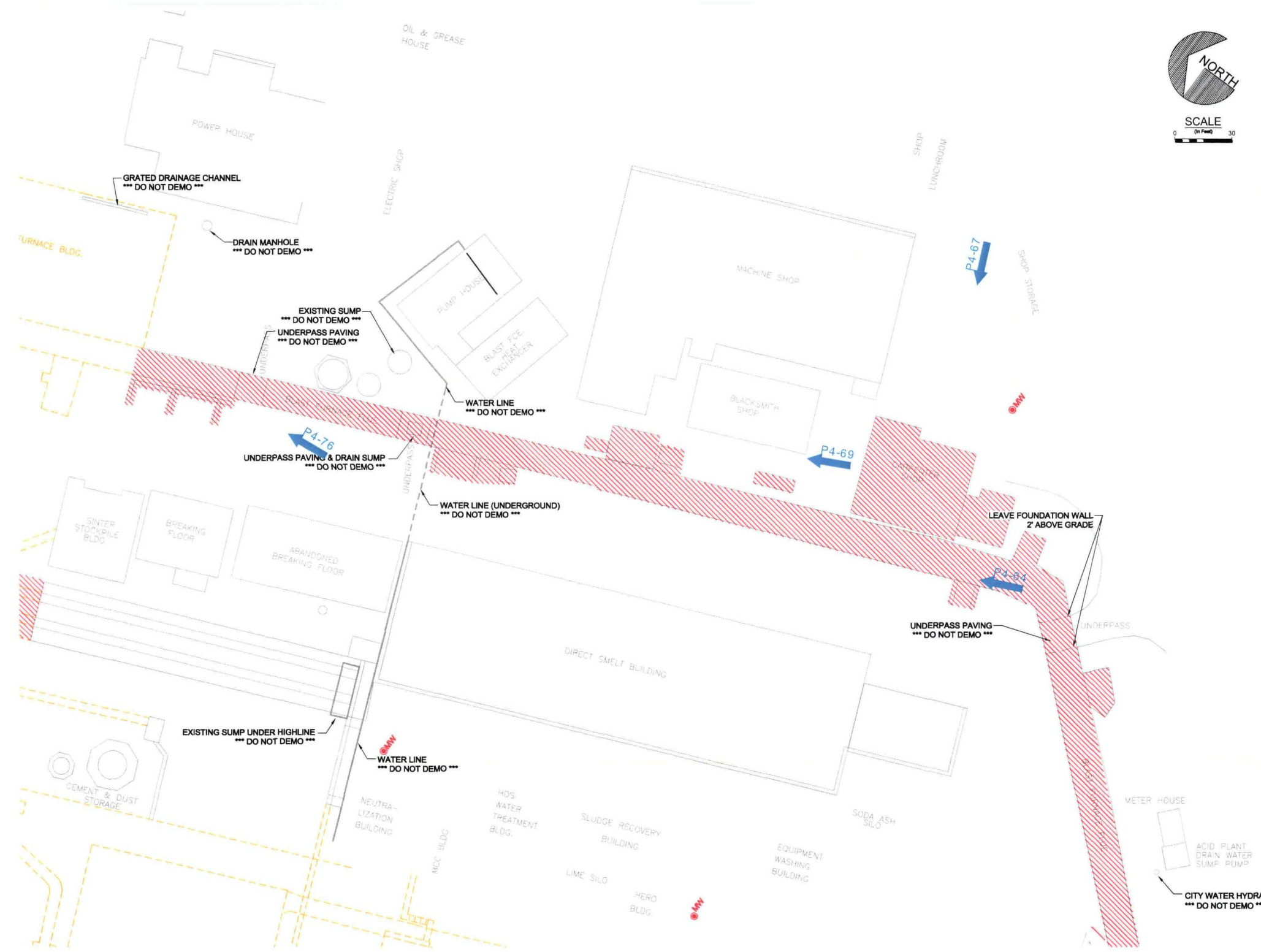
Project No.:	7054
DRAWN BY	USDLT 1/17/07
CHECKED BY	MWR 1/19/07
APPROVED BY	MJO 1/19/07
SCALE:	1"=30'

**Hydrometrics, Inc.**  
Consulting Scientists and Engineers  
Helena, Montana 59601  
3020 Boseman Avenue  
(406) 448-4180

ASARCO LLC - EAST HELENA PLANT  
2008 CLEANING & DEMOLITION PROJECT  
2008 DEMOLITION  
CRUSHING AND SAMPLE MILL AREA

DRAWING FILE NUMBER	705403H012.dwg
AUTOCAD 2004 DRAWING (DWG)	
SHEET NUMBER	11
REV	

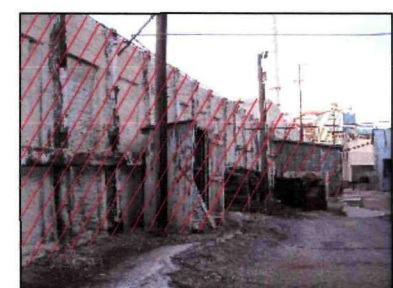




P4-64 WEST SIDE OF BLAST FURNACE FLUE



P4-67 CARPENTER SHOP & MISC. OUT BUILDINGS



P4-69 EAST SIDE OF BLAST FURNACE FLUE & MISC. STRUCTURES



P4-76 BLAST FURNACE FLUE, BINS, & DUCT SUPPORT

- LEGEND**
- 2007 AND PRIOR DEMOLITION WORK
  - EXISTING STRUCTURES
  - 2008 DEMOLITION WORK
  - P4-1 PHOTO NUMBER AND VIEWING ANGLE
  - MW MONITORING WELL - DO NOT DEMO

- NOTES:**
- 2008 DEMOLITION STRUCTURES ARE MARKED WITH RED X'S AND STRUCTURES MARKED WITH BLACK X'S ARE TO BE LEFT UNDISTURBED.
  - DEMOLISH STRUCTURES TO EXTERIOR GRADE UNLESS CONSTRUCTED OF BRICK.
  - DEMOLISH BRICK STRUCTURES TO 3 FEET BELOW GRADE.

**NOTE:**  
THE CLEANING AND DEMOLITION OF THE BLAST FURNACE FLUE AND MONIER FLUE WILL BE GOVERNED BY PROCEDURES SET FORTH IN THE EPA APPROVED INTERIM MEASURES WORK PLAN ADDENDUM (MAY 2008)

NO	BY	DATE	DESCRIPTION

SCALE VERIFICATION  
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1  
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

Project No.: 7054
DRAWN BY: USD/LT 1/17/07
CHECKED BY: MWR 1/19/07
APPROVED BY: MJO 1/19/07
SCALE: 1"=30'

**Hydrometrics, Inc.**  
Consulting Scientists and Engineers  
Helena, Montana 59801  
9020 Broadway Avenue  
(406) 443-4780

ASARCO LLC - EAST HELENA PLANT  
2008 CLEANING & DEMOLITION PROJECT  
DEMOLITION PHASE IV -  
BLAST FURNACE FLUE AREA

DRAWING FILE NUMBER	705403H013.dwg
AUTOCAD 2004 DRAWING (DWG)	
SHEET NUMBER	12
REV	





**NOTES:**

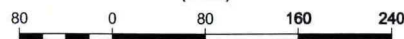
1. PREPARE SUBGRADE BY REMOVING ANY EXPOSED METAL OR SHARP OBJECTS.
2. USE FUMED FINE SLAG OR OTHER MATERIAL SUITABLE AS ON-SITE BORROW TO BRING LOW AREAS AND DEPRESSIONS UP TO A GRADE THAT ENSURES DRAINAGE OF THE CAP TO THE SITE STORMWATER DRAIN SYSTEM.
3. OVERLAP NON-WOVEN GEOTEXTILE A MINIMUM OF 12 INCHES.
4. Z-FOLD AND STITCH REINFORCED POLYETHYLENE (RPE) GEOMEMBRANE AT ALL SEAMS.
5. IN AREAS WHERE LINERS WILL BUTT AGAINST CONCRETE FOUNDATIONS ATTACH WITH 2"x4" TREATED TIMBERS WRAPPED WITH AT LEAST ONE FULL WRAP IN THE LINER AND ANCHORED TO THE CONCRETE WITH CONCRETE ANCHOR BOLTS AS ADDITIONAL SUPPORT USE A SIKA-FLEX CAULK TO SEAL BETWEEN THE LINER AND THE CONCRETE.
6. CONTRACTOR IS RESPONSIBLE FOR THEIR OWN QUANTITY ESTIMATES.
7. COMPLETE MONITORING WELL EXTENSIONS IN ACCORDANCE WITH MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION (MDNRC) MONITORING WELL REGULATIONS AND BY A LICENSED MONITORING WELL CONSTRUCTOR. SEE DETAIL 10/14.
8. COMPLETE LINER JUNCTIONS AT MONITORING WELLS, POWER POLES, AND WATER LINES ACCORDING TO DETAIL 9/14.
9. GRADE TRANSITIONS BETWEEN EXISTING TEMPORARY CAPS AND 2008 TEMPORARY CAP LINERS SO THAT WATER IS ABLE TO FLOW OFF CAP WITHOUT PONDING. OVERLAP TRANSITIONS AS DESCRIBED IN NOTES 3 AND 4.
10. ENSURE CAP GRADE EXCEEDS 1.5%. CAPS EXCEEDING GRADES OF 30% REQUIRE CONTINUOUS LINES OF SANDBAGS ON 5' SPACING.

**LEGEND**

- 2007 AND PRIOR DEMOLITION WORK
- EXISTING STRUCTURES
- 2006 TEMPORARY CAP
- 2007 TEMPORARY CAP
- 2008 TEMPORARY CAP
- SURFACE WATER DRAINAGE INLET AREAS



**SCALE**  
(In Feet)



NO	BY	DATE	DESCRIPTION	NO	BY	DATE	DESCRIPTION

SCALE VERIFICATION  
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1  
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

Project No.: 7054  
DRAWN BY: USD 1/17/07  
CHECKED BY: MWR 1/19/07  
APPROVED BY: MJO 1/19/07  
SCALE: 1"=80'

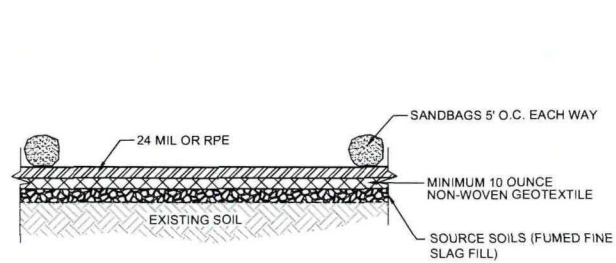
**Hydrometrics, Inc.**  
Consulting Scientists and Engineers  
Helena, Montana 59801  
3020 Cassman Avenue  
(406) 443-1100

**ASARCO LLC - EAST HELENA PLANT**  
**2008 CLEANING & DEMOLITION PROJECT**

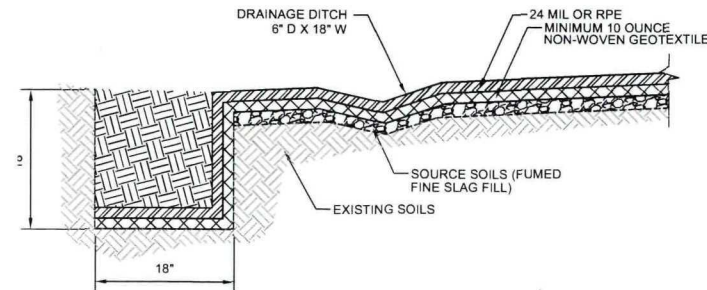
**2008 COVER SYSTEM AND INTERIM CAP - PLAN**

DRAWING FILE NUMBER	
705403H014.dwg	
AUTOCAD 2004 DRAWING (DWG)	
SHEET NUMBER	REV
13	△

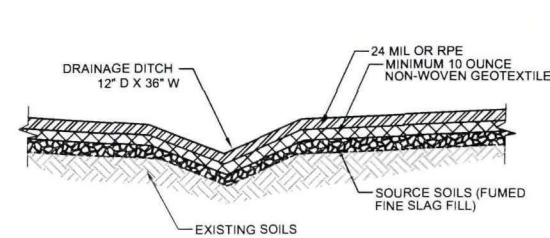




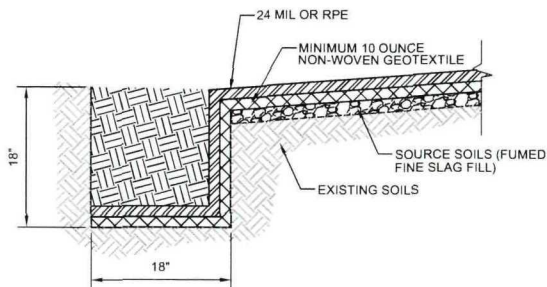
1  
14  
**DETAIL**  
TEMP CAP  
SCALE: NTS



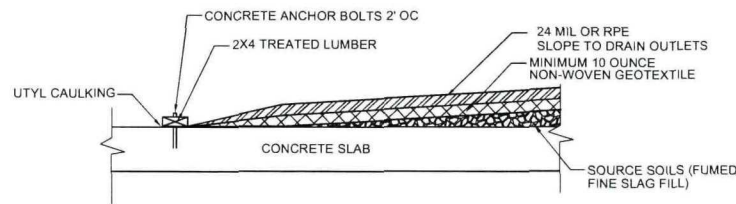
2  
14  
**DETAIL**  
LINER ANCHOR TRENCH WITH DRAINAGE DITCH  
SCALE: NTS



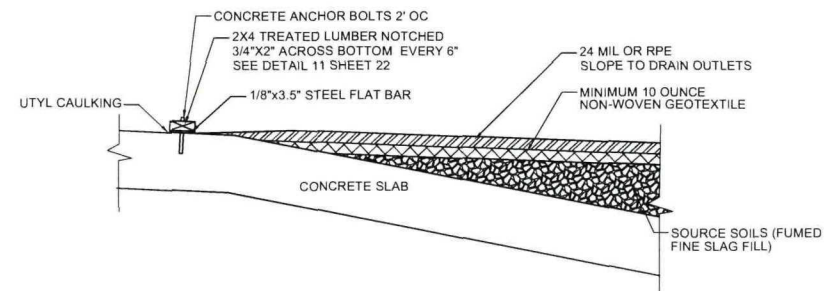
3  
14  
**DETAIL**  
LINER DRAINAGE DITCH (TYP)  
SCALE: NTS



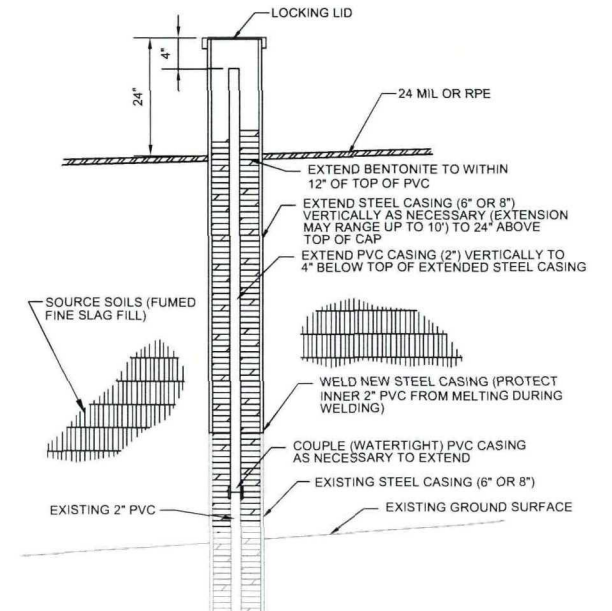
4  
14  
**DETAIL**  
LINER ANCHOR TRENCH  
SCALE: NTS



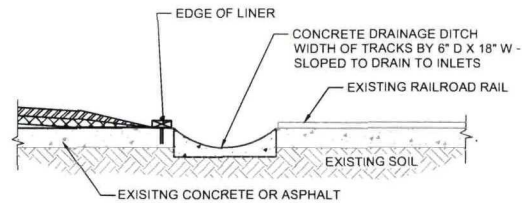
5  
14  
**DETAIL**  
LINER CONCRETE ANCHOR  
SCALE: NTS



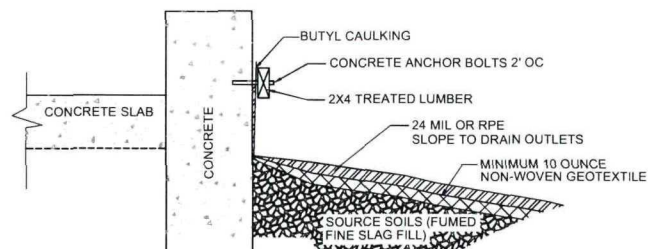
6  
14  
**DETAIL**  
RUN-ON LINER/CONCRETE ANCHOR  
SCALE: NTS



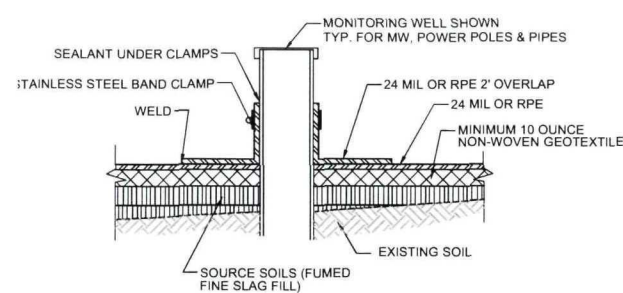
10  
14  
**DETAIL**  
MONITORING WELL EXTENSION  
SCALE: NTS



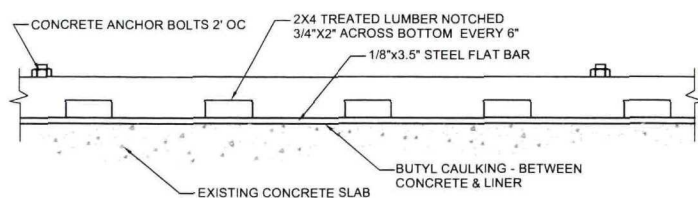
7  
14  
**DETAIL**  
CONCRETE DRAINAGE DITCH  
SCALE: NTS



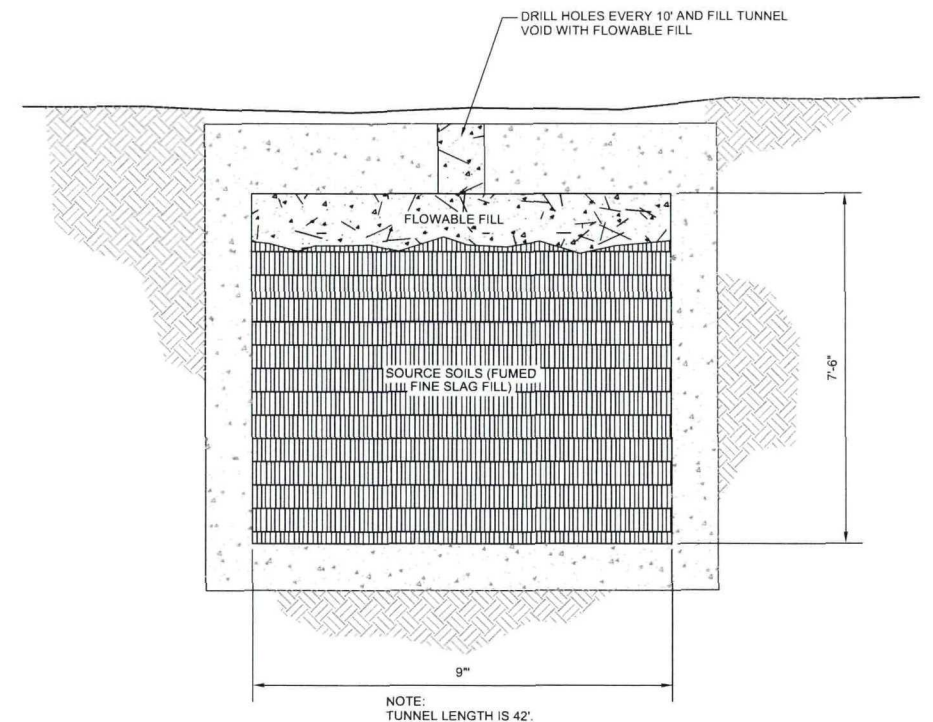
8  
14  
**DETAIL**  
LINER WALL/FOUNDATION ANCHOR  
SCALE: NTS



9  
14  
**DETAIL**  
PROTRUSION & LINER CONNECTION (TYP)  
SCALE: NTS



11  
14  
**DETAIL**  
RUN-ON ANCHOR DETAIL  
SCALE: NTS



SECTION A  
SCALE: NTS  
14  
**TUNNEL DETAIL**

NO	BY	DATE	DESCRIPTION	NO	BY	DATE	DESCRIPTION

SCALE VERIFICATION  
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1  
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

Project No.: 7054  
DRAWN BY: JSD 1/19/07  
CHECKED BY: MWR 1/23/07  
APPROVED BY: MJO 1/24/07  
SCALE: AS NOTED

**Hydrometrics, Inc.**  
Consulting Scientists and Engineers  
Helena, Montana 59601  
3025 Southern Avenue  
(406) 443-4100

ASARCO LLC - EAST HELENA PLANT  
2008 CLEANING & DEMOLITION PROJECT

DETAILS

DRAWING FILE NUMBER  
705403H015.dwg  
AUTOCAD 2004 DRAWING (DWG)  
SHEET NUMBER  
14